1960 BUYERS' GUIDE

INSTRUMENTS AND CONTROL SYSTEMS

PART TWO OF TWO-PART OCTOBER 1959

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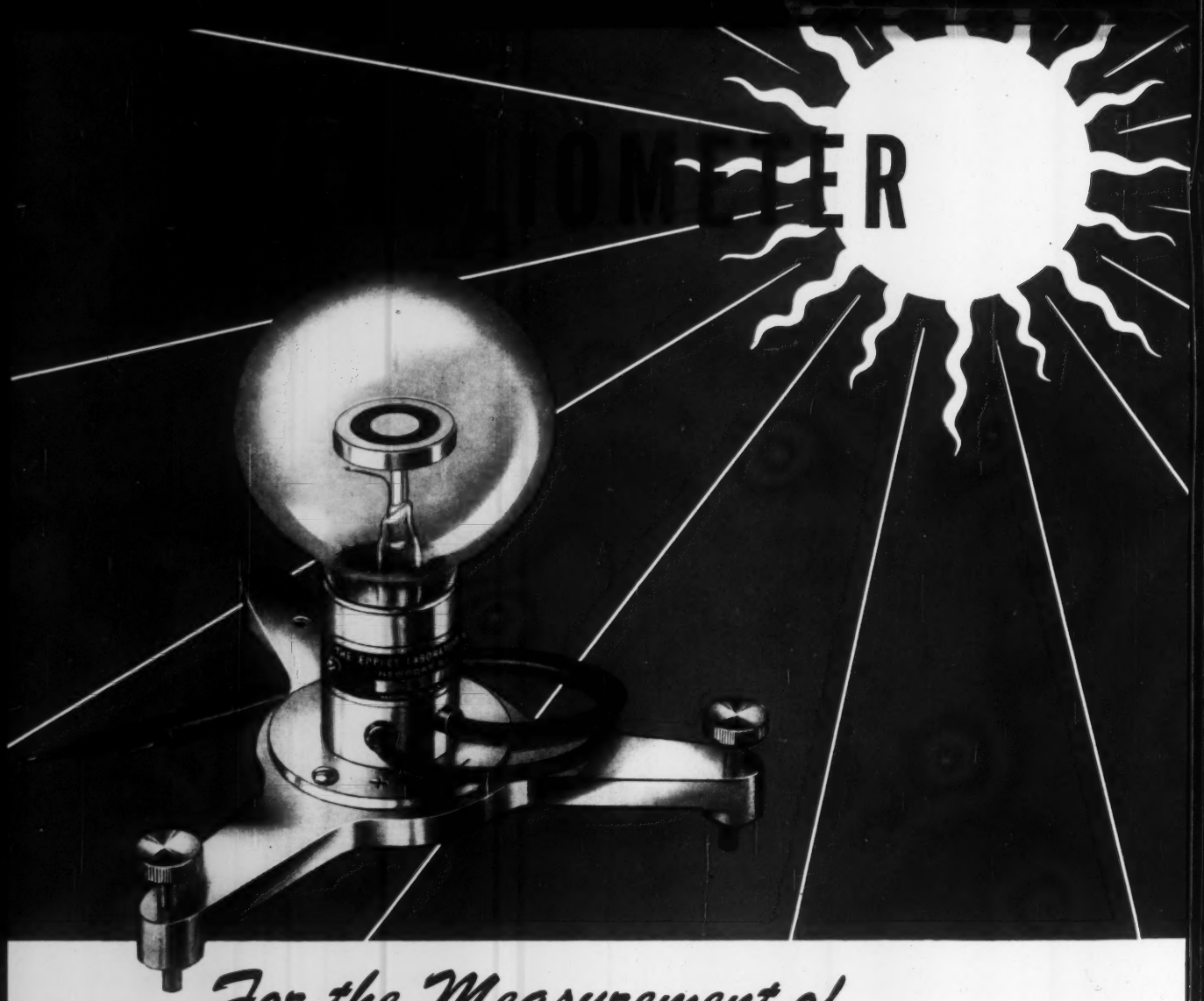

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PART TWO

OCTOBER 1959

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INSTRUMENTS AND CONTROL SYSTEMS

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about this

INSTRUMENTS AND CONTROL SYSTEMS

1960 BUYERS' GUIDE

THIS all-new 17th edition of the Guide incorporates several changes designed to make it more useful to you, the buyer of instruments and devices for measurement, inspection, testing, analysis, computing and automatic control.

About 2,000 companies cooperated to make this edition possible. Their returned questionnaires provide the basis for all the listings herein. Some 319 companies, by advertising herein, further supported this guide to all industry buyers of instruments, controls, systems, components and accessories.

In using this directory, you are urged to consult the advertisements. They're positioned to enable your quick reference—they contain valuable data which can save you time and correspondence in product selection and procurement.

First among the new features is the division of the main index section into nine separate departments. This enables more rapid location of suppliers products peculiar to particular applications. The Table of Contents on page one lists all of the separate sections and their locations. A "title page" precedes each section—describes the type of equipment covered.

A complete Product Index is also included in this edition. It contains all of the headings which appear in the nine catalog sections, plus "reference" headings to aid in location of specific items.

Recommended procedure for using the 1960 Buyers' Guide suggests that you look first in the Product Index for the specific item in which you are interested—then turn to the catalog to which that item directs you. There you will find not only a list of the manufacturers and suppliers of the specific item, but also manufacturers of associated and allied equipments.

To find the addresses of the manufacturers and suppliers, then turn to the Directory of Manufacturers, at the back of the book. It will pay to contact more than one of the companies listed as sources for the item desired, as each has its specialties and specialized features.

Another new feature designed to facilitate your buying activities—for the first time, manufacturers' telephone numbers are included with their listings in the Directory of Manufacturers. Where no number is listed, none was provided by the manufacturer.

A valuable feature from last year's edition has also been retained this year. Manufacturers' representatives and sales offices are listed for those reps and manufacturers who purchased this service. It further helps you find close-to-home sources of supply, service, and information.

Throughout this directory, listings are by *basic variable*. Therefore, look for "pressure," "temperature," "flow," etc. DO NOT look for "instruments," "gages," "meters," "indicators," etc. An exception to this is the listing of certain general-purpose devices, such as "recorders."

This 1960 I&CS Buyers' Guide provides you a more complete and serviceable directory than any previous edition. But . . . as it is all-new, a few omissions will no doubt come to light. Your editors would much appreciate your reporting these so that the next edition may be that much closer to perfection.

PRODUCT INDEX

This PRODUCT INDEX will help you find the product listings in the several catalogs. All products are listed here in alphabetical order. First find the product in which you are interested; directly under the product you will see a catalog number. Turn to this catalog to find the names of the firms making that product. When you have the company names, turn to pages 197 to 219 to find the addresses for the companies.

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BOMBS, Specific Gravity, see Specific Gravity Bombs (Cat. 4)

BORE INSPECTION INSTRUMENTS, see Telescopes, Bore, Inspection (Cat. 6)

BOTTLES, Cubic Foot, see Specific Gravity Bottles (Cat. 4)

BOTTLES, Specific Gravity, see Specific Gravity Bottles (Cat. 4)

BOTTLES, Weighing, see Weighing Bottles (Cat. 4)

BOURDON TUBES and COILS, see Tubing, Bourdon (Cat. 9)

BOW CIRCLES, See Drawing Instruments (Cat. 7)

BOXES, see Cabinets (Cat. 9), also Panels (Cat. 8)

BOXES, Ayrton, see Shunts (Cat. 3)

BOXES, Resistance, see Resistance Boxes (Cat. 3)

BOXES, Thermostat, see Thermostats (Cat. 1)

BRAKE TESTING INSTRUMENTS (Cat. 6)

BRAKES, Mechanical and Magnetic (Cat. 8)

BRIDGES, Balancing and Calibrating, Manual; AC,; Electrical, Capacitance; Electrical, Conductivity; DC; Hoopes; Impedance; Electric Inductance; Kelvin; Limit; Power-Factor; Strain Gage; Vacuum Tube; Wattmeter; Wheatstone (Cat. 3)

BRIDGES, Electrical, Self-balancing, see Potentiometers (Cat. 3)

BRINNELL Machines, see Hardness Testing Machines, Brinell (Cat. 6)

B.T.U. INDICATORS (Cat. 1)

BUBBLERS, see Sight Flow Bubblers (Cat. 1)

BURETTES (Cat. 4)

BURSTING TESTING MACHINES, including Mullen Testers (Cat. 6)

BUSHINGS, Fused Silica, see Silica, Fused (Cat. 9)

CABINETS, Instruments (Cat. 9)

CABINETS, Test see Environmental Test Chambers (Cat. 1)

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CABLE, Flexible, Control (Cat. 8)

CABLE ASSEMBLIES (Cat. 8)

CABLE CONNECTORS, see Connectors (Cat. 8)

CABLE SUPPORTS, see Tubing Supports (Cat. 9)

CABLE TESTERS (Cat. 6)

CALIBRATING EQUIPMENT for Electrical Instruments, see Electrical Instrument Calibrators (Cat. 3)

CALIBRATING EQUIPMENT for Testing Machines, see Testing Machine Calibrators (Cat. 6)

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CALIPERS, see Dimensional Gages (Cat. 6)

CALORIMETERS, Adiabatic, Coal and Fuel (Cat. 4)

CALORIMETERS, Gas (Cat. 4)

CALORIMETERS, Miscellaneous, including Peroxide Bomb, Photoelectric, Steam, etc. (Cat. 4)

CAMERA SHUTTER TESTERS (Cat. 6)

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CAMERAS, Scientific, including Back Reflection (Cat. 2)

CAMERAS, Scientific, Diffraction, see X-Ray Cameras, Diffraction (Cat. 4)

CAMERAS, Scientific, Motion Picture, including High Speed (Cat. 2)

CAPACITANCE INDICATORS (Cat. 3)

CAPACITORS, Air (Cat. 8)

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CAPACITORS, Electrolytic (Cat. 8)

CAPACITORS, Fixed Composition (Cat. 8)

CAPACITORS, High Voltage (Cat. 8)

CAPACITORS, Metallized Paper (Cat. 8)

CAPACITORS, Mica (Cat. 8)

CAPACITORS, Paper (Cat. 8)

CAPACITORS, Plastic Dielectric (Cat. 8)

CAPACITORS, Precision (0.01%)—Cat. 8

CAPACITORS, Tantalum (Cat. 8)

CAPACITORS, Vacuum (Cat. 8)

CAPACITORS, Variable (Cat. 8)

CAPACITORS, Vitreous Enamel (Cat. 8)

CAPACITY METERS, see Capacitance Indicators (Cat. 3)

CARBON DIOXIDE METERS, see Gas Analyzers (Cat. 1)

CARBON MONOXIDE METERS, see Gas Analyzers (Cat. 1)

CARBON PILES, see Resistors, Carbon Compression (Cat. 8)

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CELLS, Heat Sensing, see Conductivity Cells (Cat. 8)

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CEMENT NEEDLE APPARATUS (Cat. 6)

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CHAMBERS, Test and Calibration, see Environmental Test Chambers (Cat. 1)

CHANGERS, Frequency, see Frequency Changers (Cat. 3)

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CHASSIS, Instrument—Cat. 8, (see also Cabinets—Cat. 9; also Cases—Cat. 8)

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CHEMICAL FEEDERS, Dry and Liquid (Cat. 1)

CHLORINE TESTING APPARATUS (Cat. 4)

CHOKES, see Coils (Cat. 8)

CHOPPERS, DC-AC, see Converters, Vibrator, DC-AC (Cat. 8)

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CHRONOGRAPHS (Cat. 7)

CHRONOMETERS (Cat. 7)

CIRCUIT ANALYZERS, Industrial (Cat. 3)

CIRCUIT BREAKER ANALYZERS (Cat. 3)

CIRCUIT TESTERS, including Radio Set Analyzers, Continuity Testers, etc.—Cat. 3, (see also Cable Testers—Cat. 4)

CIRCUITS, Graphic, including Printed, Electric, Stamped, Etched, and Components (Cat. 8)

CIRCUITS, Potted, including Embedded Components (Cat. 8)

CIRCUITS and COMPONENTS, Plug-in (Cat. 8)

CLAMPS, Cable, Conduit, Tube (Cat. 8)

CLEANING COMPOUNDS for Instruments (Cat. 9)

CLEANING MACHINES, Instrument, including Vapor Degreasers, Detergent and Ultrasonic (Cat. 9)

CLINOGRAPHS, Bore Hole (Cat. 5)

CLINOMETERS, Angular Measuring (Cat. 5)

CLINOMETERS, Geologists (Cat. 5)

CLIPS, Battery—Cat. 8, (see also Connectors—Cat. 8)

CLIPS, Fahnestock (Cat. 8)

CLIPS, Fuse, Grid, Test (Cat. 8)

CLOCKS, Master or Primary (Cat. 1)

CLOCKS, Minute Impulse and Synchronous (Cat. 1)

CLOCKS, Program, see timers, Automatic Process, also Program Controllers (Cat. 1)

CLOCKS, Secondary (Cat. 1)

CLOCKS, Standard (Cat. 1)

CLOCKS, Stop (Cat. 1)

CLOCKWORKS, Electric, including Instrument Drivers (Cat. 8)

CLOCKWORKS, Mechanical, including Instrument Drives (Cat. 8)

CLOCKWORKS, Pneumatic, including Instrument Drives (Cat. 8)

CLOSURES, Protective (Cat. 9)

CLOTH, Wire (Cat. 9)

CLOUD AND POUR TEST APPARATUS (Sat. 4)

CLUTCHES, Mechanical, Magnetic (Cat. 8)

COAL TEST INSTRUMENTS AND APPARATUS (Cat. 4)

COCKS, Glass (Cat. 4)

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COIL TESTING EQUIPMENT (Cat. 3)

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COILS, Toroidal (Cat. 8)

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COMBUSTION CONTROL EQUIPMENT (Cat. 1), (see also Boiler Room Instruments—Cat. 1)

COMBUSTION INDICATORS and/or Recorders, see Boiler Room Instruments, also Gas Analyzers (Cat. 1)

COMBUSTION SAFEGUARDS, including Flame Failure (Cat. 1)

COMMUNICATION MEASURING INSTRUMENTS (Cat. 3)

COMMUTATORS, including Collector Rings (Cat. 8)

COMPARATORS, Mechanical, see Dimensional Gages, Mechanical (Cat. 6)

COMPARATORS, Optical, see Dimensional Gages Optical (Cat. 6)

COMPARATORS, Surface Finish, see Dimensional Gages, Surface Finish (Cat. 6)

COMPARATORS, Voltage, see Voltage Comparators (Cat. 3)

COMPASSES, Aircraft (Cat. 5)

COMPASSES, Azimuth (Cat. 5)

COMPASSES, Dip (Cat. 5)

COMPASSES, Drafting Room, see Drawing Instruments (Cat. 7)

COMPASSES, Gyro (Cat. 5)

COMPASSES, Magnetic (Cat. 5)

COMPASSES, Marine (Cat. 5)

COMPASSES, Radio (Cat. 5)

COMPASSES, Telltale, see Compasses, Marine (Cat. 5)

COMPOSITION ANALYZERS, see Analytical Instruments (Cat. 4)

COMPOUNDS, Cleaning, see Cleaning Compounds (Cat. 9)

COMPUTERS, Analog, Electronic (Cat. 2)

COMPUTERS, Digital, Electronic—Cat. 2, (see also Digital Building Blocks—(Cat. 2)

COMPUTERS, Mechanical and Electro-Mechanical, including Desk Computing Machines (Cat. 2)

COMPRESSION TESTING MACHINES, see Testing Machines (Cat. 6)

COMPRESSORS, Instrument-Air, see Air Compressors (Cat. 1)

CONCENTRATION RECORDERS, see Analytical Instruments (Cat. 4), pH (Cat. 1), etc.

CONCRETE and CEMENT TEST APPARATUS (Cat. 6)

CONDENSATION CONTROLLERS, see Boiler Room Instruments (Cat. 1)

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CONDUCTIVITY CELLS (Cat. 8)

CONDUCTIVITY METER (Cat. 3)

CONNECTORS, Plugs, Clips, Posts, Jacks (Cat. 8)

CONNECTORS, Printed Circuit (Cat. 8)

CONSISTENCY REGULATORS, Pulp and Paper (Cat. 1)

CONSTANT SPEED AND FREQUENCY SETS, see Speed (Cat. 1) or Frequency (Cat. 3)

CONTACTORS, see Relays (Cat. 8)

CONTACTS, Electrical, including Carbon, Metal, Graphite, Powdered Metal, Precious Metal (Cat. 8)

CONTOUR MEASURING PROJECTORS, see Dimensional Gages, Optical (Cat. 6)

CONTROL BOARDS, see Panels (Cat. 8)

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CONTROL SYSTEMS, General-purpose, Air-operated (Cat. 1)

CONTROL SYSTEMS, General-purpose, Electrical or Electronic (Cat. 1)

CONTROL SYSTEMS, General-purpose, Electromechanical (Cat. 1)

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CONTROL SYSTEMS, Machine Tool, see Machine Tool Controllers (Cat. 1)

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CONTROLLERS, see Object of Measurement and Control. For example, for Flow Controller, see Flow (Cat. 1)

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CONTROLLERS, Bin, see Level (Cat. 1)

CONTROLLERS, Condensation, Condenser Leakage, Damper, Desuperheat, Draft, or Feed Water, see Boiler Room Instruments (Cat. 1)

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CONTROLLERS, Furnace, see Combustion Control, also Furnace Control (Cat. 1)

CONTROLLERS, Gas Density, see Density (Cat. 1)

CONTROLLERS, Light, see Illumination (Cat. 1)

CONTROLLERS, Moisture, see Humidity (Cat. 1)

CONTROLLERS, Power Factor, see Power Factor, (Cat. 1)

CONTROLLERS, RKVA, see Electric Power Generation Instruments (Cat. 3)

CONTROLLERS, Rate-Volume, see Flow (Cat. 1)

CONTROLLERS, Stoker, see Boiler Room Instruments (Cat. 1)

CONTROLLERS, Temperature-Time, see Program Controllers (Cat. 1)

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CONVERTERS, AC to DC, including Rotary (Cat. 8)

CONVERTERS, Analog-to-Digital (Cat. 2)

CONVERTERS, Binary-to-Decimal (Cat. 2)

CONVERTERS, DC to AC, including Magnetic and Transistorized (Cat. 8)

CONVERTERS, DC toDC, Transistorized (Cat. 8)

CONVERTERS, Digital-to-Analog (Cat. 2)

CONVERTERS, Electric-to-Hydraulic (Cat. 8)

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CONVERTERS, Frequency (Cat. 8)

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COUNTERS, Electronic, including events-per-unit-time (Cat. 1)

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COUNTERS, Mechanical, including Stroke (Cat. 1)

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COUNTERS, Geiger-Mueller (Cat. 4)

COUNTERS, Photoelectric (Cat. 2)

COUNTERS, Photoelectric Curve Followers (Cat. 2)

COUNTERS, Predetermined, including Batch (Cat. 1)

COUNTERS, Radiation, see Counters, Geiger-Mueller, also Radioactivity Instruments (Cat. 4)

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COUNTERS, Scintillation (Cat. 4)

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DEMAND, Indicators or Recorders, see Load Indicators, Electrical (Cat. 3)

DEMODULATORS, Electronic (Cat. 3)

DENSITOMETERS, Gas and or Liquid, including Densimeters, Microdensitometers, etc.—Cat. 4, (see also Specific Gravity—Cat. 4)

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DETECTORS, Alpha Ray, Beta Ray, Gamma Ray, etc., see Radioactivity Instruments (Cat. 4)

DETECTORS, Benzol, see Gas Analyzers (Cat. 1)

DETECTORS, Carbon Monoxide, see Gas Analyzers (Cat. 1)

DETECTORS, Combustible Gas, see Gas Analyzers (Cat. 1)

DETECTORS, Crystal, see Crystals (Cat. 8)

DETECTORS, Electrical Ground, see Ground Detectors (Cat. 3)

DETECTORS, Explosion, see Combustion Safeguards (Cat. 1)

DETECTORS, Fire, see Fire Detectors (Cat. 1)

DETECTORS, Flaw, see Flaw Detectors (Cat. 6)

DETECTORS, Gamma Ray, see Radioactivity (Cat. 4)

DETECTORS, Gas including Methane and Mine Gases, see Gas Analyzers (Cat. 1)

DETECTORS, Hazardous or Poisonous Gas, see Gas Analyzers (Cat. 1)

DETECTORS, Hydrogen Sulphide, see Gas Analyzers (Cat. 1)

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DETECTORS, Leak, see Leak (Cat. 1)

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DETECTORS, Mercury Vapor, see Gas Analyzers (Cat. 1)

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DETECTORS, Methane, see Gas Analyzers (Cat. 1)

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DETECTORS, Mine Gases, see Gas Analyzers (Cat. 1)

DETECTORS, Neutron, see Radioactivity (Cat. 4)

DETECTORS, Oxygen Deficiency, see Gas Analyzers (Cat. 1)

DETECTORS, Pin Hole, see Flaw Detectors (Cat. 6)

DETECTORS, Radiation or Radioactivity (Dosimeters), see Radioactivity (Cat. 4)

DETECTORS, Radium, see Radioactivity (Cat. 4)

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DIAPHRAGMS, Leather, Fabric and or Rubber (Cat. 8)

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DIGITAL BUILDING BLOCKS, including Computer Components (Cat. 2)

DIGITAL READOUT INDICATORS—Cat. 2, (See also Data Processing—Cat. 2)

DIGITAL RECORDERS, see Printers (Cat. 2)

DIGITALIZERS, see Converters, Analog-to-Digital (Cat. 2)

DILATOMETERS (Cat. 4)

DIMENSIONAL GAGES, Optical including Comparators, Interferometers, Micrometers, Projectors, Telescopic (Cat. 6)

DIMENSIONAL GAGES, Electronic, including Comparators, Micrometers (Cat. 6)

DIMENSIONAL GAGES, Mechanical, including Adjustable Length, Bore, Caliper, Center, Coating Thickness, Concentricity, Cylinder, Dial, Drill Grinding, End Measure, Foot Blocks, Gage Blocks, Height, Linear, Depth, Micrometer, Pipe, Piston Ring, Pitch Diameter, Plug, Profile, Radius, Taper, Thickness, etc. (Cat. 6)

DIMENSIONAL GAGES, Pneumatic, including Comparators (Cat. 6)

DIMENSIONAL GAGES, Running Length including Wire, Cable, and Flexible Material (Cat. 6)

DIMENSIONAL GAGES, Surface Finish (Cat. 6)

DIODE TEST SETS (Cat. 3)

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DIODES, Silicon (Cat. 8)

DIRECTION INDICATORS, Radioactuated—Cat. 5, (see also Aircraft Instruments, also Navigation Aids—Cat. 5)

DISPLACEMENT INDICATORS, and or **RECORDERS**, Angular and Nonlinear and Motion (Cat. 1)

DISPLACEMENT INDICATORS and or **RECORDERS**, Linear Motion (Cat. 1)

DISPLACEMENT PICKUPS, Capacitance Type (Cat. 1)

DISPLACEMENT PICKUPS, Differential Transformer Type (Cat. 1)

DISPLACEMENT PICKUPS, Magnetic, including Variable Reluctance (Cat. 1)

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DISSOLVED-OXYGEN RECORDERS, see Gas Analyzers (Cat. 1)

DISTILLATION APPARATUS (Cat. 4)

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DOLLIES, Oscilloscope & Laboratory (Cat. 6)

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DRIVES, Variable Speed (Cat. 8)

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DUST ANALYSIS APPARATUS, see Air Pollution, also Air Particle (Cat. 4)

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DYNAMOTORS, including Transistorized (Cat. 8)

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EBULLIOMETERS (Cat. 4)

EBULLISCOPES, see Ebullliometers (Cat. 4)

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ELECTRIC POWER GENERATION INSTRUMENTS, including Power Analyzers, Frequency and Phase Instruments, Substation Instruments (Cat. 3)

ELECTRIC WAVE FILTER SECTIONS, see Filters, Frequency (Cat. 8)

ELECTRICAL INDICATORS, see Ammeters, Voltmeters, etc. (Cat. 3)

ELECTRICAL INSTRUMENT CALIBRATORS and **TEST SETS** for Voltage, Current, etc. (Cat. 3)

ELECTROANALYSIS APPARATUS (Cat. 4)

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ELECTROMECHANICAL COMPONENTS, see Servomotors (Cat. 5); also Relays, also Gears, also Clutches, etc. (Cat. 8)

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ELECTROMETERS, Quadrant, String, Vibrating Reed (Cat. 3)

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END MEASURES, see Dimensional Gages (Cat. 6)

ENGINE COMPRESSION INDICATORS, see Engine Test Instruments (Cat. 6)

ENGINE GOVERNORS, including Internal Combustion Engines, Steam Turbines, etc. (Cat. 1)

ENGINE INDICATORS, see Engine Test Instruments (Cat. 6)

ENGINE TEST INSTRUMENTS, including Ignition Analyzers, Compression Indicators, etc. (Cat. 6)

ENGRAVING EQUIPMENT, including Metal and Plastic, see Machines, Engraving (Cat. 9)

ENGRAVING OF GLASS, see Machines, Engraving (Cat. 9)

ENVIRONMENTAL TEST CHAMBERS and **EQUIPMENT**, including Humidity, Pressure, Saltspray, Sand Temperature, Ultraviolet (Cat. 1)

EUSCOPES (Cat. 4)

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EXTENSOMETERS (Cat. 6)

FADING TESTERS, including Fade-ometers—Cat. 4, (see also Environmental Testing Equipment—Cat. 1)

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FAULT LOCATORS, Communication and Lines, Electrical Resistance (Cat. 3)

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FEEDERS, Automatic Proportioning, including Granular Material (Cat. 1)

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FILTERS, Air, see Air Cleaners (Cat. 1)

FILTERS, Band Elimination and or Band Pass (Cat. 8)

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FILTERS, Electrical Wave, see Filters, Frequency (Cat. 8)

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FILTERS, Radio Noise, see Filters, Frequency (Cat. 8)

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FLOWMETERS, Inferential Type, including Orifice, Nozzle, Pitot, Venturi; for Air, Gas, Liquid or Steam; Indicating and/or Recording (Cat. 1)

FLOWMETERS, Magnetic (Cat. 1)

FLOWMETERS, Open Channel, including Flume, V-notch, Weir—Cat. 1, (see also Waste—Cat. 1)

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GEARS, Precision, including Gear Trains, Gear Hubs, Pinions, etc. (Cat. 8)

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GLASS, Shatterproof for Instruments (Cat. 9)

GLASS TEST INSTRUMENTS, including Hardness, Immersion Liquids, Refraction, Strain, etc. (—Cat. 6, see also Refractometers—Cat. 4)

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RELAYS, Vacuum Tube, see Relays, Electronic (Cat. 8)

RELAYS, Vibrating Reed Type (Cat. 8)

RELIEF VALVES, see Valves, Relief (Cat. 1)

REMOTE-CONTROL EQUIPMENT, see Telemetering (Cat. 1)

REMOTE-METERING EQUIPMENT, Electrical, see Telemetering (Cat. 1)

REMOTE-METERING EQUIPMENT, Pneumatic, see Pressure Transmitters (Cat. 1)

RESISTANCE BOXES, including Decade, Dividing, etc. (Cat. 3)

RESISTANCE COMPARATORS (Cat. 3)

RESISTANCE INDICATORS, Ground, Insulation, Megohm, Milliohm, Ohm (Cat. 3)

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RESISTOR BOBBINS, Precision, Ceramic (Cat. 9)

RESISTOR CORES, Ceramic (Cat. 9)

RESISTOR STANDARDS, see Standards (Cat. 3)

RESISTORS, Adjustable (Cat. 8)

RESISTORS, Ballast (Cat. 8)

RESISTORS, Carbon Composition and or Variable (Cat. 8)

RESISTORS, Decade (Cat. 3)

RESISTORS, Deposited Carbon (Cat. 8)

RESISTORS, Encapsulated (Cat. 8)

RESISTORS, High Frequency (Cat. 8)

RESISTORS, High Megohm (Cat. 8)

RESISTORS, High Voltage (Cat. 8)

RESISTORS, Manganin (Cat. 8)

RESISTORS, Molded (Cat. 8)

RESISTORS, Negative Temperature Coefficient (Cat. 8)

RESISTORS, Non-Inductive (Cat. 8)

RESISTORS, Precision (accuracy better than 1%)—Cat. 8

RESISTORS, Tape (Cat. 8)

RESISTORS, Temperature Sensitive, see Thermistors (Cat. 8)

RESISTORS, Voltage Sensitive, see Varistors (Cat. 8)

RESISTORS, Wire Wound (2 watts and under)—Cat. 8

RESISTORS, Wire Wound (2 to 500 watts)—Cat. 8

RESISTORS, Wire Wound (500 to 1500 watts)—Cat. 8, (see also Rheostats—Cat. 8)

RESISTORS, Woven (Cat. 8)

RESOLVERS, see Synchros (Cat. 8)

RETICLES (Cat. 8)

REVOLUTION COUNTERS, see Counters, also Tachometers (Cat. 1)

RHEOSTATS, Field (Cat. 8)

RHEOSTATS, Laboratory and or Meter Testing (Cat. 4)

RHEOSTATS, Slide Wire and Variable—Cat. 8, (see also Resistors—Cat. 8)

RIBBON, Metal, Rolled to Small Fractional Dimensions (Cat. 9)

RINGS, COLLECTOR, see Slip Rings (Cat. 9)

RODS, Pinion, Drawn Shapes (Cat. 9)

RODS, Platinum and Precious Metals (Cat. 9)

RUBBER TESTING MACHINES and INSTRUMENTS (Cat. 6)

RULES, including Aluminum, Brass, Stainless Steel and Steel (Cat. 7)

RULES, Adjustable Curve, see Drawing Instruments (Cat. 7)

RULES, Caliper, see Dimensional Gages, Mechanical (Cat. 6)

RULES, Drafting Room, see Drawing Instruments (Cat. 7)

RULES, Glass (Cat. 9)

RULES, Precision Standard (Cat. 7)

RULES, Slide, see Sliderules (Cat. 7)

RUNNING TIME RECORDERS, see Time Recorders (Cat. 1)

RUPTURE DISCS, see Pressure Relief (Cat. 1)

SACCHARIMETERS (Cat. 4)

SACCHAROMETERS (Cat. 4)

SAFETY VALVES, see Valves, Relief (Cat. 1)

SALINITY INDICATORS (Cat. 4)

SALINOMETERS, see Salinity (Cat. 4)

SALT SPRAY TESTERS, see Environmental Test Chambers (Cat. 1)

SAMPLERS, Air, see Air Pollution (Cat. 4)

SAMPLERS, Boiler Water, see Boiler Room Instruments (Cat. 1), also Water Analysis (Cat. 4)

SAMPLERS, Miscellaneous (Cat. 4)

SAMPLERS, Sewage, see Waste Treatment (Cat. 1)

SAPPHIRE BOULES (Cat. 9)

SAPPHIRE RODS, see Sapphire (Cat. 9)

SAPPHIRE, Special Shapes and Parts, Balls, Rods, Styli (Cat. 9)

SATURABLE REACTORS, see Amplifiers (Cat. 3)

SAUNDERS PATENT VALVES, see Valves, Diaphragm Seal, including Saunders Patent, Crane, Wynn Type, etc. (Cat. 1)

SAWS, Jewelers' Type, see Jewelers (Cat. 9)

SCALERS, Decade, see Counters, Decade (Cat. 3)

SCALERS, Geiger-Mueller, see Counters, Geiger-Mueller, also Radioactivity (Cat. 4)

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SCALES, Instrument (Cat. 8)

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SCANNERS (Cat. 1)

SCINTILLATION COUNTERS, see Counters, Scintillation (Cat. 4)

SCRATCH HARDNESS TESTING MACHINES (Cat. 6)

SCREENS, X-Ray, Fluoroscopic, including Intensifying (Cat. 4)

SCREW DRIVERS, Instrument (Cat. 9)

SCREW DRIVERS, Torque, see Wrenches, Torque (Cat. 9)

SCREW MACHINES, see Machines, Screw (Cat. 9)

SCREW THREAD GAGES, see Dimensional Gages (Cat. 6)

SCREWS, Instrument (Cat. 9)

SCREWS, Lead, Precision (Cat. 9)

SCREWS, Stainless Steel (Cat. 9)

SEGER CONES, see Pyrometric Cones (Cat. 1)

SEISMOLOGICAL INSTRUMENTS, including Seismographs (Cat. 5)

SERVO SYSTEM ANALYZERS (Cat. 5)

SERVO VALVES, Hydraulic (Cat. 1)

SERVOMECHANISMS, including Servo Systems, Kits—Cat. 5, (see also Servomotors—Cat. 5, also Clutches, and Gears—Cat. 8)

SERVOMECHANISMS, Digital, including Digital Positioners (Cat. 5)

SERVOMOTORS, Electric Motor and or Solenoid (Cat. 5)

SERVOMOTORS, Hydraulic, Mechanical, and Pneumatic (Cat. 5)

SEXTANTS, see Navigational Instruments (Cat. 5)

SHAFTING, Flexible (Cat. 9)

SHAKE TABLES, see Vibration Test (Cat. 1)

SHEETS, Beryllium Copper, Brass, Bronze, Copper (Cat. 9)

SHEETS, Columbium, Molybdenum (Cat. 9)

SHIELDING, MAGNETIC, see Magnetic (Cat. 8)

SHIELDS, Lead (Cat. 9)

SHIELDS, Transformer (Cat. 9)

SHIELDS, Tube (Cat. 9)

SHIP LOGS, see Marine Instruments (Cat. 5)

SHIPBORNE INSTRUMENTS, see Marine Instruments (Cat. 5)

SHOCK MOUNTINGS, see Mountings (Cat. 8)

SHUNTS, including Shunt Meters, Ayrton (Cat. 3)

SIEVE SHAKERS, (Cat. 6)

SIEVES, Testing (Cat. 6)

SIGHT FLOW BUBBLERS (Cat. 1)

SIGHT FLOW INDICATORS, see Flowmeters, Sight (Cat. 1)

SIGHTS, Gun, Telescopic (Cat. 5)

SIGNAL GENERATORS, see Generators (Cat. 3)

SIGNAL LIGHTS, see Pilot Lights (Cat. 8)

SIGNALING DEVICES, Automatic, see Monitors (Cat. 1)

SILICA Fused and or Vitreous (Cat. 9)

SILVER, see Precious Metals (Cat. 9)

SIMULATORS, Flight including Flight Tables (Cat. 5)

SINE BARS, see Dimensional Gages (Cat. 6)

SLIDERULES, Engineering Calculation (Cat. 7)

SLIP RINGS (Cat. 9)

SMOKE DENSITY INDICATORS and or RECORDERS (Cat. 1)

SMOOTHNESS RECORDERS, see Dimensional Gages, Surface (Cat. 6)

SNUBBERS, see Pressure Snubbers (Cat. 1)

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SOCKETS, Lamp, Printed Circuit, Transistor, Tube, and Turret (Cat. 9)

SOCKETS, Thermometer, see Thermowells (Cat. 1)

SOFTNESS TESTERS (Cat. 6)

SOIL TESTERS (Cat. 6)

SOLAR BATTERIES, see Batteries, Solar (Cat. 8)

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SOLDERS, Gold and or Silver (Cat. 9)

SOLDERS, Hard (Cat. 9)

SOLDERS, Soft (Cat. 9)

SOLDERS, Special, including Flux-filled (Cat. 9)

SOLENOIDS—Cat. 8, (see also Relays—Cat. 8)

SOLENOIDS, Rotary (Cat. 8)

SOLENOIDS, Subminature (Cat. 8)

SORTING EQUIPMENT, including Gaging (Cat. 6)

SOUND ANALYZERS, including Noise (Cat. 3)

SOUND INDICATORS, including Noise Indicators and Noise Measuring Sets (Cat. 3)

SOUND LEVEL INDICATORS, including db Meters (Cat. 3)

SOUND PICKUPS, see Microphones (Cat. 8)

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SOUNDING MACHINES AND LEADS (Cat. 5)

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SPECIFIC GRAVITY BALANCES (Cat. 4)

SPECIFIC GRAVITY BOMBS (Cat. 4)

SPECIFIC GRAVITY BOTTLES (Cat. 4)

SPECIFIC GRAVITY CONTROLLERS, INDICATORS and RECORDERS (Cat. 1)

SPECTROGRAPHS (Cat. 4)

SPECTROMETERS (Cat. 4)

SPECTROMETERS, Infrared, Mass (Cat. 4)

SPECTROMETERS, X-ray, see Spectrographs (Cat. 4)

SPECTROPHOTOMETERS (Cat. 4)

SPECTROPHOTOMETERS, Ultraviolet (Cat. 4)

SPECTROSCOPES (Cat. 4)

SPECTROSCOPES, Quartz (Cat. 4)

SPECTROSCOPES, Stellar (Cat. 4)

SPECTRUM ANALYZERS, AF (Cat. 3)

SPECTRUM ANALYZERS, RF including Panoramic Adapters (Cat. 3)

SPECTRUM ANALYZERS, Optical (Cat. 4)

SPEED INDICATORS, RECORDERS and REGULATORS, including Speed Switches (Cat. 1)

SPEED REDUCERS and SPEED INCREASERS (Cat. 1)

SPEED SYNCHRONIZING INDICATORS (Cat. 1)

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SPHYGMOMANOMETERS (Cat. 4)

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STEAM GOVERNORS, see Boiler Room Instruments (Cat. 1)

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STRESS-STRAIN ANALYZERS, INDICATORS and/or CONTROLLERS (Cat. 1)

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SULPHUR DIOXIDE INDICATORS, and or RECORDERS, see Gas Analyzers (Cat. 1)

SUNSHINE INDICATORS and/or RECORDERS (Cat. 5)

SUPERVISORY CONTROL EQUIPMENT and SYSTEMS, see Control Systems, also Telemetering (Cat. 1)

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SURFACE PLATES, Stone (Cat. 6)

SURFACE TENSION INSTRUMENTS (Cat. 4)

SURVEYING INSTRUMENTS, including Aneroid Type (Cat. 7)

SURVEYING INSTRUMENTS, Underground, for wells or bore holes —Cat. 7, (see also Geophysical Instruments—Cat. 7)

SURVEYOR CHAINS, see Surveying Instruments (Cat. 7)

SWITCHES, Air Operated (Cat. 8)

SWITCHES, Instrument, including Wiping, Selecting, etc. (Cat. 8)

SWITCHES, Magnetic (Cat. 8)

SWITCHES, Mercury (Cat. 8)

SWITCHES, Precssure and Vacuum (Cat. 8)

SWITCHES, Pyrometer (Cat. 8)

SWITCHES, Ratary, including Shaft Motion Types (Cat. 8)

SWITCHES, Sealed (Cat. 8)

SWITCHES, Snap Action (Cat. 8)

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SWITCHES, Stepping, including Motors, Step Type—Cat. 8, (see also Relays—Cat. 8)

SWITCHES, Thermostatic (Cat. 8)

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SYNCHROS, including Transmitters, Receivers, Differentials, Control Transformers, Receivers —Cat. 8, (see also Servomotors—Cat. 5)

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TACHOGRAPHS (Cat. 1)

TACHOMETER TESTERS (Cat. 6)

TACHOMETERS, Centrifugal (Cat. 1)

TACHOMETERS, Chronometric (Cat. 1)

TACHOMETERS, Electric and Electromagnetic (Cat. 1)

TACHOMETERS, Miscellaneous, including Cross Pendulum, Fly-ball, Ignition actuated, Tiltingring—Cat. 1, (see also Frequency—Cat. 3.)

TACHOMETERS, Recording (Cat. 1)

TACHOMETERS, Speed Limit Control (Cat. 1)

TACHOMETERS, Stroboscopic (Cat. 1)

TACHOMETERS, Vibrating Reed (Cat. 1).

TACHOSCOPES (Cat. 1)

TAFFRAIL LOGS, Ship, see Marine Instruments (Cat. 5)

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TAPE RECORDERS, see Recorders, Magnetic Tape (Cat. 2)

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TELEGRAPHY, Automatic, including Reperforators, Tape Perforators, Tape Transmitters, Teleprinters, Teletypers (Cat. 2)

TELEMETERING SYSTEMS, Electrical, including Remote-Control Equipment (Cat. 1)

TELEMETERING SYSTEMS, Penumatic (Cat. 1)

TELEMETERING SYSTEMS, RF, including Microwave, Radio Remote Control (Cat. 1)

TELEMETERS, Surveying and Military, Optical (Cat. 5)

TELESCOPES, Alignment (Cat. 6)

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TELESCOPES, Azimuth and/or Zenith (Cat. 5)

TELESCOPES, Bore and Internal Surface, Inspection (Cat. 6)

TELESCOPES, Laboratory (Cat. 4)

TELESCOPES, Reflection and/or Refracting (Cat. 5)

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TENSIOMETERS (Cat. 6)

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TERMINALS, Blocks, Boards, and Shapes (Cat. 8)

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TEST CHAMBERS, see Environmental Test Chambers (Cat. 1)

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TESTERS, Altimeters, see Aircraft Instrument Testers (Cat. 5)

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TESTERS, Deadweight, see Pressure Instrument Calibrators, Deadweight (Cat. 6)

TESTERS, Dew Point, see Humidity Instruments (Cat. 1)

TESTERS, Fuel, see Gas Analyzers (Cat. 1), Coal Test, etc. (Cat. 4)

TESTERS, Moisture, see Moisture (Cat. 4), also Environmental Test (Cat. 1)

TESTERS, Mullen, see Bursting Testing (Cat. 6)

TESTERS, Non-destructive, Electrical, for Physical Properties (Cat. 6)

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TESTING MACHINES, Fatigue, see Fatigue (Cat. 6)

TESTING MACHINES, Glass Strain, see Glass Test (Cat. 6)

TESTING MACHINES, Gummed Tape, Paper, see Paper Test (Cat. 6)

TESTING MACHINES, High Pressure, see Bursting Testing Machines (Cat. 6)

TESTING MACHINES, Knit Goods, see Textile Testing (Cat. 6)

TESTING MACHINES, Leather, see Leather Testing (Cat. 6)

TESTING MACHINES, Miscellaneous, including Alternating Stress, Bending, Compression, Creep, Deflection, Ductility, Impact, Pendulum, Stiffness and Bending, Stretch, etc.—Cat. 6, (see also Testing Machines, Universal—Cat. 6)

TESTING MACHINES, Paper, see Paper Testing (Cat. 6)

TESTING MACHINES, Vibration, see Vibration (Cat. 1)

TESTING MACHINE (UNIVERSAL) CALIBRATORS, including Proving Rings (Cat. 6)

TESTING MACHINES, Universal, Dead Weight Beam (Cat. 6)

TESTING MACHINES, Universal, Hydraulic (Cat. 6)

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THERMO-AMMETERS, see Ammeters (Cat. 3)

THERMOCOUPLE EXTENSION WIRE in Multiple Pair Cables (Cat. 8)

THERMOCOUPLE INSULATORS (Cat. 8)

THERMOCOUPLE WELLS, see Thermowells (Cat. 1)

THERMOCOUPLE WIRE and COMPONENTS, including Extension Lead Wire (Cat. 8)

THERMOCOUPLES, Base Metal—Cat. 1, (see also Wire, Thermocouple —Cat. 9)

THERMOCOUPLES, Contact Type—Cat. 1, (see also Thermometers, Surface—Cat. 1)

THERMOCOUPLES, Immersion (Cat. 1)

THERMOCOUPLES, Rare Metal (Cat. 1)

THERMOCOUPLES, Vacuum (Cat. 8)

THERMOHYDROMETERS, see Hydrometers (Cat. 4)

THERMOMETER TESTERS, see Temperature Calibration (Cat. 1)

THERMOMETER TEST WELLS, see Thermowells (Cat. 1)

THERMOMETER TUBES, see Thermowells (Cat. 1)

THERMOMETERS, Dial, Bimetal (Cat. 1)

THERMOMETERS, Dial, Gas, Mercury, Organic Liquids filled, or Vapor-pressure (Cat. 1)

THERMOMETERS, Electrical Resistance, Indicating, Recording and/or Controlling (Cat. 1)

THERMOMETERS, Indicating, Glass, including Mercury, Spirit (Cat. 1)

THERMOMETERS, Indicating, Pressure-spring (Cat. 1)

THERMOMETERS, Maximum and Minimum Register.ng (Cat. 1)

THERMOMETERS, Recording and/or Controlling, Filled Systems (Cat. 1)

THERMOMETERS, Surface (Cat. 1)

THERMOMETERS, Thermistor—Cat. 1, (see also Thermistors —Cat. 8)

THERMOPILES, see Radiation Pickups (Cat. 4)

THERMOSTATIC ELEMENTS and Metals, including Bimetallic Materials, Springs, Strips, Fabricated Parts, etc. (Cat. 9)

THERMOSTATS (Cat. 1)

THERMO-VOLTMETERS, see Voltmeters, Thermo (Cat. 3)

THERMOWELLS (Cat. 1)

THICKNESS GAGES (Cat. 6)

THICKNESS GAGES, Radiation (Cat. 6)

THICKNESS GAGES, Ultrasonic (Cat. 6)

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TIME CONTROLLERS, see Timers (Cat. 1)

TIME INDICATORS, see Clocks, also Watches, (Cat. 1)

TIME INTERVAL APPARATUS, see Counters, also Timers (Cat. 1)

TIME RECORDERS, including Running Time, Time Operation, Time Totalizers, etc. (Cat. 1)

TIME STUDY APPARATUS (Cat. 1)

TIMERS, including Automatic Reset, Cycle Interval—Cat. 1, (see also Program Controllers—Cat.1)

TIMERS, Microsecond—Cat. 1, (see also Counters, Electronic—Cat. 1)

TIN RIBBON, Block (Cat. 9)

TITRATION APPARATUS, Electrometric (Cat. 4)

TITRATION APPARATUS, Manual (Cat. 4)

TITROMETERS (Cat. 4)

TONG AMMETERS, see Ammeters (Cat. 3)

TOOLMAKER'S FLATS (Cat. 6)

TOOLS, Precision (Cat. 9)

TOPOGRAPHIC INSTRUMENTS, see Surveying Instruments (Cat. 7)

TORQUE CONTROL EQUIPMENT and GAGES (Cat. 1)

TORQUE TESTERS (Cat. 6)

TOTALIZERS, Demand (Cat. 1)

TOTALIZERS, Electric Energy (Cat. 1)

TOTALIZERS, Fluid Flow and/or Gas Flow, see Flow Totalizers (Cat. 1)

TOTALIZERS, Running Time, see Time Recorders (Cat. 1)

TRANSDUCERS, Note: A transducer converts one form of POWER into another. For numerous primary measuring devices see the correct headings under the measurables; e.g. Displacement Pickups, Flow Pickups, Pressure Pickups, etc.

TRANSDUCERS, Ultrasonic (Cat. 8)

TRANSFORMERS, Ajustable, see Transformers, Variable (Cat. 8)

Transformers, Constant Voltage—Cat. 8, (see also Voltage Regulators —Cat. 3)

TRANSFORMERS, Differential, see Displacement Pickups, Differential Transformers (Cat. 1)

TRANSFORMERS, High Frequency (Cat. 8)

TRANSFORMERS, Impedance (Cat. 8)

TRANSFORMERS, Input, Output, and Interstage, including AF, IF, and RF (Cat. 8)

TRANSFORMERS, Instrument including Current, and/or Potential, Laboratory (Cat. 8)

TRANSFORMERS, Insulation Testing (Cat. 8)

TRANSFORMERS, Isolation (Cat. 8)

TRANSFORMERS, Microwave (Cat. 8)

TRANSFORMERS, Phasing (Cat. 8)

TRANSFORMERS, Power (Cat. 8)

TRANSFORMERS, Pulse (Cat. 8)

TANSFORMERS, Saturable., see Amplifiers (Cat. 3)

TRANSFORMERS, Split Core (Cat. 8)

TRANSFORMERS, Ultrasonic (Cat. 8)

TANSFORMERS, Variable, including Auto-transformers (Cat. 8)

TRANSFORMERS, Variable, Voltage Testing (Cat. 8)

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TRANSFORMERS, Voltage Regulating, see Transformers, Constant Voltage (Cat. 8)

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TRANSISTORS (Cat. 8)

TRANSITS, Engineer's, see Surveying Instruments (Cat. 7)

TRANSITS, Pocket (Cat. 7)

TRANSMITTERS, see Telemetering, also Pressure Transmitters, also Flow Transmitters (Cat. 1)

TRIMMERS, Capacitor, see Capacitors (Cat. 8)

TRUCK-MILEAGE RECORDERS, see Mileage Indicators (Cat. 7)

TUBE TESTERS, Electron (Cat. 3)

TUBES, Cathode Ray, including Display, Camera, Storage, etc. (Cat. 8)

TUBES, Discharge, Gas and Vapor, including Argon, Mercury, Neon, Sodium, etc. (Cat. 8)

TUBES, Electrometer (Cat. 8)

TUBES, Electron, Vacuum (Cat. 8)

TUBES, Geiger-Mueller—Cat. 8, (see also Counters, G-M—Cat. 4)

TUBES, Glow—Cat. 8, (see also Tubes, Discharge—Cat. 8)

TUBES, Ignitron (Cat. 8)

TUBES, Klystron (Cat. 8)

TUBES, Magnetron (Cat. 8)

TUBES, Nessler (Cat. 4)

TUBES, Photosensitive, including Phototubes and Photocells (Cat. 8)

TUBES, Polariscope (Cat. 4)

TUBES, Pyrometer Protection, see Thermowells (Cat. 1)

TUBES, Thyratron (Cat. 8)

TUBES, Travelling Wave—Cat. 8, (see also Microwave Equipment—Cat. 3)

TUBES, Ultra-Violet Light, see Light Sources (Cat. 4)

TUBES, Vacuum, see Tubes, Electron, Vacuum (Cat. 8)

TUBES, Voltage Regulator, see Tubes, Discharge (Cat. 8), also Current Regulators (Cat. 8)

TUBES, X-ray (Cat. 8)

TUBING, ARMORED, see Tubing, Capillary (Cat. 9), also Tubing, Flexible, Multiple Tube Bundles (Cat. 8)

TUBING, Bourdon (Cat. 9)

TUBING, Capillary (Cat. 9)

TUBING, Ceramic (Cat. 9)

TUBING, Fibre (Cat. 9)

TUBING, Flexible (Cat. 9)

TUBING, Flexible, Multible Tube Bundles (Cat. 8)

TUBING, Fused Quartz (Cat. 9)

TUBING, Glass Fibre, Insulation (Cat. 9)

TUBING, Laminated Phenolic (Cat. 9)

TUBING, Low Coefficient of Expansion (Cat. 9)

TUBING, Mica (Cat. 9)

TUBING, Miscellaneous, including Illium, Invar, Kovar, special alloy, tantalum (Cat. 9)

TUBING, Nickel, Monel, Inconel (Cat. 9)

TUBING, Paper (Cat. 9)

TUBING, Plastic (Cat. 9)

TUBING, Plastic Coated Copper & Aluminum (Cat. 9)

TUBING, Precious Metals, including Platinum (Cat. 9)

TUBING, Precision Bore, Glass, see Glass Tubing (Cat. 9)

TUBING, Precision Bore, Metal (Cat. 9)

TUBING, Rubber (Cat.9)

TUBING, Varnished or Lacquered (Cat. 9)

TUBING SUPPORTS, including Cable Supports, Troughs, etc. (Cat. 9)

TUNGSTEN, Wire and Products (Cat. 9)

TURBIDIMETERS (Cat. 4)

TURBINE GOVERNORS (Cat. 1)

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ULTRA-VIOLET LIGHT SOURCES (Cat. 1)

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VACUUM GAGES, Ionization (Cat. 4)

VACUUM GAGES, McLeod (Cat. 1)

VACUUM GAGES, Molecular (Cat. 4)

VACUUM GAGES, Thermocouple (Cat. 4)

VACUUM, HIGH (below 1 mu) CONTROLLERS, INDICATORS, and RECORDERS (Cat. 1)

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VALVE OPERATING DEVICES, Pneumatic, including Cylinder (Cat. 1)

VALVE OPERATING DEVICES, Solenoid (Cat. 1)

VALVE POSITIONERS (Cat. 1)

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VALVES, Bellows Seal, see Valves, Packless (Cat. 1)

VALVES, Butterfly (Cat. 1)

VALVES, Control (Cat. 1)

VALVES, Diaphragm Seal, including Saunders Patent, Crane, Wynn Type, etc. (Cat. 1)

VALVES, Flexible Sleeve (Cat. 1)

VALVES, Float-operated (Cat. 1)

VALVES, Gage Cocks (Cat. 1)

VALVES, High Pressure (Cat. 1)

VALVES, Needle (Cat. 1)

VALVES, Packless (Cat. 1)

VALVES, Plug (Cat. 1)

VALVES, Pressure Reducing and/or Back-Pressure, see Valves, Control (Cat. 1)

VALVES, Relief and Safety (Cat. 1)

VALVES, Slurry, see Valves, Flexible Sleeve (Cat. 1)

VALVES, Solenoid (Cat. 1)

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VIBROSCOPES (Cat. 1)

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VISCOSIMETERS, Kinematic (Cat. 4)

VISCOSIMETERS, Recording (Cat. 4)

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VISCOSIMETERS, Ultrasonic (Cat. 4)

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VOLTAGE REGULATORS, Line Voltage (Cat. 3)

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VOLT-AMPERE-HOUR METERS (Cat. 3)

VOLT-AMPERE METERS, Reactive (Cat. 3)

VOLTMETERS, AC, Rectifier (Cat. 3)

VOLTMETERS, Digital (Cat. 3)

VOLTMETERS, Electrostatic (Cat. 3)

VOLTMETERS, Indicating and Recoring (Cat. 3)

VOLTMETERS, Laboratory Standard (Cat. 3)

VOLTMETERS, Micro, RF, Millivolts and Microvolts (Cat. 3)

VOLTMETERS, Millivoltmeters, AC, Rectifier (Cat. 3)

VOLTMETERS, Oxide Rectifier (Cat. 3)

VOLTMETERS, Peak (Cat. 3)

VOLTMETERS, Thermo (Cat. 3)

VOLTMETERS, Thermionic Rectifier (Cat. 3)

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WATTMETERS, Electrostatic (Cat. 3)

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WATTMETERS, Microwave (Cat. 3)

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WIND TUNNEL INSTRUMENTS (Cat. 5)

WIRE, Copper, Enameled (Cat. 9)

WIRE, Covered (Cat. 9)

WIRE, Fuse (Cat. 9)

WIRE, Insulated, all insulations except enameled and refractory (Cat. 9)

WIRE, Magnet (Cat. 9)

WIRE, Metal Shielded (Cat. 9)

WIRE, Miscellaneous, including Bismuth, Columbium, Illium, Molybdenum, special alloy Tantalum (Cat. 9)

WIRE, Nickel, Monel, and Nickel Chromium (Cat. 9)

WIRE, Refractory Insulated (Cat. 9)

WIRE, Resistance (Platinum or Platinum-Iridium)—Cat. 9

WIRE, Resistance, except Platinum and Platinum-Iridium (Cat. 9)

WIRE, Spring (Cat. 9)

WIRE, Stainless Steel, see Wire, Spring (Cat. 9)

WIRE, Swedish, Music, see Wire, Spring (Cat. 9)

WIRE, Thermocouple, Base Metal (Cat. 9)

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WIRE TESTING MACHINES (Cat. 6)

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5 basic actuator sizes to cover

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SERIES

470 P.O.P.

PNEUMATICALLY OPERATED PISTON

Power: Delivers same power in either direction at any point of the stroke.

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Accuracy: Max. Hysteresis—0.15% of stroke or signal.
Repeatability—0.03% of stroke or signal.
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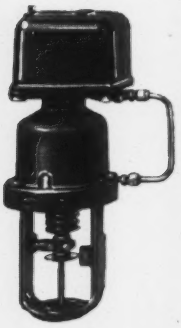
Only Fisher gives you this wide selection of actuator-body combinations. This small, compact piston actuator incorporates its own positioner mounted integrally on top of the cylinder. Positioner receives any of the normally used pneumatic instrument signals. Then, without an air set, actuator utilizes the full potential of the available instrument air or gas supply (up to 150 psi) to provide exceptional speed and power. Easily reversible actuator can be changed in the field. Also available in spring return and side mounted handjack models. Send for free booklet E-470.



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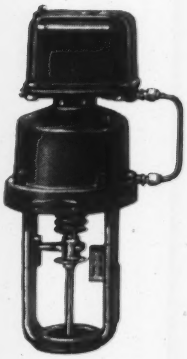

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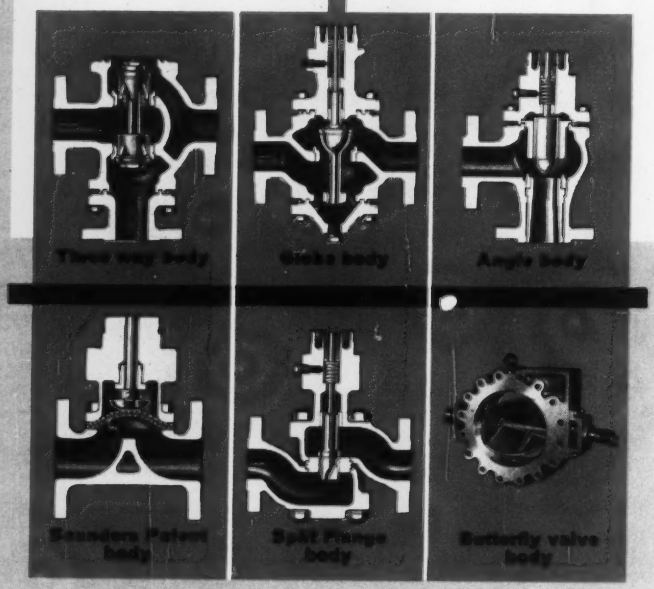

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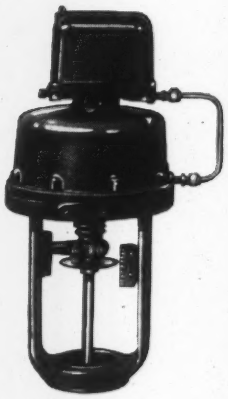
all body styles and sizes



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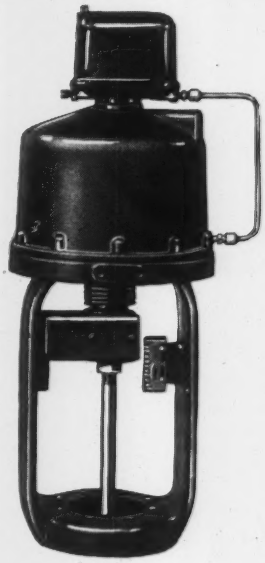

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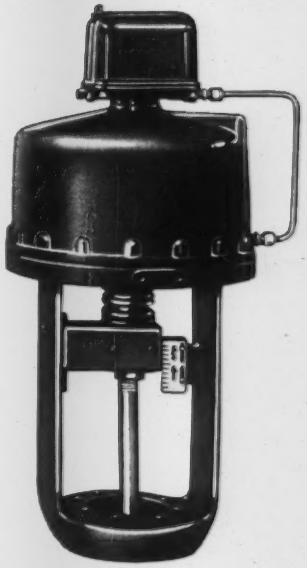
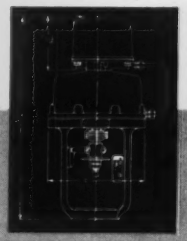


Size 100

SPECIFICATIONS

Actuator Size	Cylinder Size, Inches	Stem Size, Inches	Body Size, Inches	AVAILABLE STEM FORCE		Travel, Inches
				100 PSI Supply	150 PSI Supply	
30	4¾	⅜	½-1½	1500	—	7/16-¾
40	6⅛	½	2-4	2500	—	7/16-1½
43	4¾	½	2-4	1500	2200	7/16-1½
60	8½	¾	5-8	5000	—	7/16-2
63	4¾	¾	5-8	1500	2200	7/16-2
64	6⅛	¾	5-8	2500	3600	7/16-2
80	10¾	1	10-16	8000	—	¾-3
100	13	1¼	10-16	12000	—	¾-3

Note 1. Sizes 43, 63 and 64 may use supply pressure up to 150 psi.



Actuator Size	B Inches	C Inches
30	19¼	6¾
40	21 5/16	8⅛
60	23⅜	10½
80	33 1/16	12¾
100	33 1/16	15

FISHER® Controls SINCE 1880

FISHER GOVERNOR COMPANY

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BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIPMENT CO., CORAOPOLIS, PENNSYLVANIA

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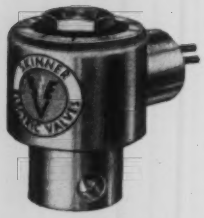
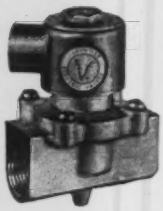


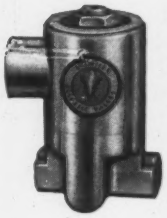
Two-way C Series

A high quality, 2-way, miniature cut-off valve offering top performance at lowest price. Small, lightweight (only 12 oz.) yet designed to operate for millions of cycles in automotive fuel systems, oil burners, vending machines, dental equipment, air horns, welding equipment, humidifiers, automated systems, etc. Available normally closed only.



Two-way L Series

A newly designed high-flow industrial valve for use with all common media such as water, oil, air, etc. Light and compact, it mounts directly to the line. Forged naval brass body, stainless steel parts and fully supported diaphragm assures long life and troublefree operation. Available normally open, normally closed and explosionproof.



Two-way R Series

A 2-way, pilot operated piston valve for use with all common media including air, inert gases, water and oil at standard and high pressures up to 1250 psi. Light and compact, it can be mounted directly to the line in any position and has a life expectancy of millions of cycles on most applications. Available normally closed, normally open and explosionproof.

Two- and Three-way V10 Series

Extremely compact, direct-acting slide type, high pressure hydraulic valve up to 1000 psi. Balanced pressure design provides maximum power. Same valve can serve as either a 2- or 3-way normally open, normally closed or 3-way directional control in machine tools, door openers, hydraulic cylinders, construction equipment, pilot for larger valve, etc.

Two- and Three-way V5 Series

Available in 2- or 3-way and explosionproof construction, this is the most popular and versatile stainless steel valve series. Over 100,000 variations available. Unlimited applications include machine tools, instrumentation, automation, air and hydraulic cylinders, oil burners, LPG equipment, dispensing machines, automotive, aircraft, dehumidifiers, laundry equipment, etc.

Three-way A Series

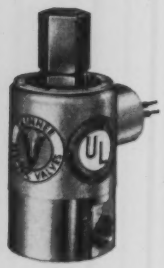
A new valve line designed for economical and efficient operation of medium size cylinders, this valve bridges the gap between the famous V5 line, used with small cylinders, and the reliable M3 line for large cylinders. It also provides faster operation of smaller cylinders where increased cycling speed is called for. It is designed for use with such media as air, oil and inert gases and can be used for vacuums down to 5 microns. Available normally open, normally closed, directional control and multi-directional.

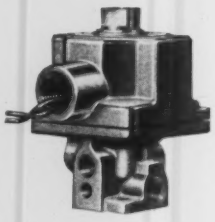
Three-Way M Series

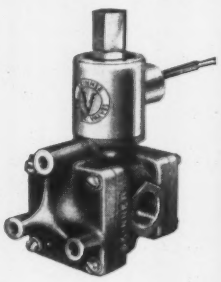
A 3-way valve for reliable high-flow industrial service under rugged conditions of use. Free-flow design provides large capacity with minimum sensitivity to media impurities in air vises, process equipment, presses, water treatment, air and hydraulic cylinders, machine tools, automotive equipment, etc. Available normally open, normally closed, directional control and explosionproof.

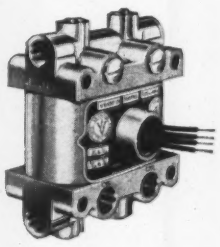
Four-way V9 Series

A compact, direct-acting, flexible all-purpose 4-way valve. Optional porting arrangements and speed control combinations provide over 350 basic variations for accurate, dependable control of single and double-acting cylinders, larger pilot-operated valves, etc. Available normally closed — normally closed, normally open — normally open, normally closed — normally open.









Skinner Solenoid Valves are distributed nationally.

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CIRCLE 3 ON READER-SERVICE CARD

Industrial / Process

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You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
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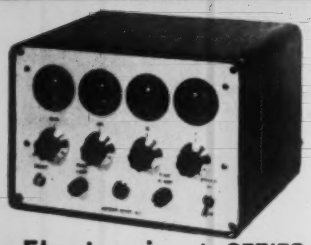
CIRCLE 4 ON READER-SERVICE CARD

NEW Veeder-Root Counters



New Electronic Predetermining Counters

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These counters are ideal for batch control, sequential predetermining, or accurate length control in such applications as packaging, coil winding, slitting, stacking and material handling.

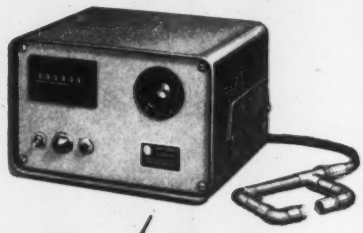
A versatile group of transistorized electronic predetermining counters designed particularly for industrial applications. These units will operate at speeds up to 5,000 counts per second, with automatic recycling at speeds up to 1,000 counts per second. A photohead to actuate the counter can be designed to fit specific applications.

Units can be easily operated by non-technical personnel. The preset quantity can be established quickly at any point within the range of the counter by means of the large selector knobs. Any number of decades can be furnished.

Dual sets of presetting controls for sequential predetermining, or accurate length control in such applications can be furnished on request.

This is your complete package for predetermining counting at high speeds.

For complete details on these units, write today!



Count-PAK

SERIES 1661

Complete electronic counting package for use where high speed, long life and instant reset are required. Highly suitable for high speed direct counting applications such as can and bottle counting or case or piece counting on conveyor lines.

Consists of glow-transfer cold-cathode counting tube and high speed magnetic counter, coupled with transistorized circuits. Photohead designed to your application.

The use of transistors means that heat has been eliminated and no warm up time is required. Unit is completely enclosed in an attractive industrial case to insure long, trouble-free life. Use of an electronic decade increases the life of the electro-mechanical counter and makes the unit ideal for continuous rugged operation.

Write for complete specifications and prices today!

NEW SERIES 1522

High-Speed Predetermining Counter

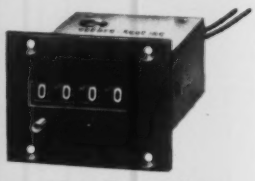
Ideal for high-speed counting requirements such as coil winding, textile spinning frames, and other predetermining counter requirements.

Instant quick-lever reset, plus quick and easy setting of the predetermined number are outstanding features of this counter. Measures approximately 2.6″ wide, 5″ long, 2.8″ high. Speeds up to 6,000 RPM or 8,000 CPM are maximums recommended.

Easily preset to the required number of pieces or performance-units, the counter subtracts to zero. Resetting returns wheels to original preset number. This new counter meets standard U. S. electrical requirements (JIC Codes) . . . and is available with either electrical switch or mechanical stop. Also available without the predetermining feature, as a high speed reset revolution counter.

Also available as a high-speed revolution counter without predetermining feature.

Write for complete information today!



SERIES 1591

Electro-Magnetic Counter

These new compact panel-mounted high speed counters are ideal for D.C. applications requiring accuracy, long life at high speeds and small panel presentation. Counters are suitable for industrial data processing, laboratory and scientific or instrument applications. Available with four or six figures with remote electrical or manual (push button) reset. 3,000 counts per minute recommended speed.

Counters can be connected in series with any device having a contact arrangement. For optimum operation, 60% contact time is required.

Panel Area: 4-figure Counter — 1.7″ x 2.1″
6-figure Counter — 1.7″ x 2.8″

Available for 6, 12, 24, 48 and 115 volts D.C. operation. For A.C. operation suitable electrical components must be added externally. Reset voltages available are 6, 12, 24, 48, 115 and 230.

Write for complete specifications today!

Veeder-Root
INCORPORATED
HARTFORD 2, CONNECTICUT
Hartford, Conn. • Greenville, S. C. • Altoona, Pa. • Chicago • New York
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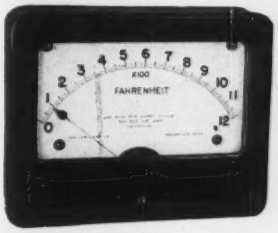
CIRCLE 5 ON READER-SERVICE CARD

LEWIS

AUTOMOTIVE AND INDUSTRIAL TEMPERATURE MEASURING EQUIPMENT

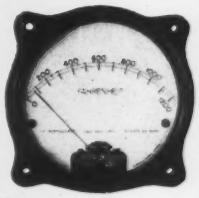
Sturdy Dependable Indicators —Suitable For Use In Moving Vehicles or For Permanent Installation

This instrument has been used extensively by the leading motor-car manufacturers for road testing on the "Proving Grounds" — where performance counts. Housed in a rectangular bakelite case, this reliable, fully compensated pyrometer is furnished with 6 in. hand drawn scales for greater accuracy. The Model 58PY is available for use with all standard thermocouple materials, in many ranges to suit the most exacting application.



MODEL 58PY

Manufactured with the same type of movement as our aircraft pyrometers, the Model 23B pyrometer is well suited for use in moving vehicles and has been successfully used in many marine diesel installations for measuring exhaust temperatures. It is housed in a 4 in. round bakelite case that is flanged for panel mounting, and is available in several ranges for use with various thermocouple materials.



MODEL 23B

The Model 20B series of indicators are patterned after our standard aircraft instruments and are supplied with 3" round steel cases suitable for panel installation. These compact, sturdy indicators have 2⅛ in. scales, are fully cold-end compensated and are available in many ranges for use with various thermocouple materials.

MODEL 20B

The Model 62RT4F resistance thermometer is a sturdy easy-to-read instrument with a 6 in. hand drawn scale. It is suitable for use in moving vehicles and is excellent for flight-test work. It is operated by an ordinary dry cell and is calibrated to standard "AN" bulb curves for various ranges in fahrenheit or centigrade.

MODEL 62RT4

THERMOCOUPLES for use with the above indicators are available in many styles for special applications. We have developed a complete line of aircraft, industrial and automotive thermocouples and would be pleased to offer our recommendation for your application.

THERMOCOUPLE LEAD WIRE for connecting thermocouples to the indicators is manufactured in iron-constantan, copper-constantan or chromel-alumel material with standard and special insulation. Use Lewis lead-wire with Lewis instruments and thermocouples for best results.

RESISTANCE BULBS for use as sensing elements for the 62RT4 thermometers are available in several types for various applications, for measuring free air or liquid temperatures. We invite inquiries on your application.

THE LEWIS ENGINEERING CO.

Specialists in Electrical Temperature Measurements

NAUGATUCK, CONNECTICUT

CIRCLE 6 ON READER-SERVICE CARD

Alnor® FOR PRECISE MEASUREMENT OF

TEMPERATURE...

AIR VELOCITY...

DEW POINT...

PYROMETERS

A complete line of single or multiple-point pyrometers—portable or mounted—for temperature measurement in all types of service. Particularly adapted to exhaust, cooling water and lubricating oil temperature measurements on diesel and gas engines. For furnaces, kilns, ovens, vats, pots, heat exchangers, kettles, reactors, autoclaves, pipe lines and any similar equipment where accurate temperatures are desired.

PYROCON

A self-contained, hand-held portable contact pyrometer. Takes any surface temperature. Widely used in plastic molding, chemical processing, electrical, rubber and paper manufacturing industries. Available with fixed or flexible arm.

VELOMETERS

An instantaneous air velocity meter giving direct readings in feet per minute without necessity of timing, calculation, or reference to tables or charts. A compact, self-contained, portable unit. For low range readings, Velometer is held in air stream. For high range readings, tube-connected special jets provide convenient use in any location. Standard ranges from 20 f.p.m. to 24,000 f.p.m.

DEWPOINTERS

An improved instrument for simple, rapid dew point reading of any gas. Indication takes place in an enclosed observation chamber under accurately controlled conditions. Dew or fog suspended in air—not on mirrored surface—makes it easy for two or more observers to get the same accurate results. The Alnor Dewpointer is a complete, self-contained unit—no external coolants or other apparatus are required.

SURFACE PYROMETER

The Alnor type 2300 Pyrometer sets a new high in precision measurement of low surface temperatures. Special design, from Alnico magnet to the finest, quick reacting thermocouple, assures unfailing accuracy ...speed and dependability. This is a self-contained, sturdy unit—easily carried and used anywhere on a wide variety of applications. Direct reading, six-inch mirrored scale is easily read...quickly understood. The instrument is available in five Fahrenheit scale ranges with a span as small as 150°.

PORTABLE PYROMETER

The Alnor type 1500 is designed for work with electrically heated mantles. This lightweight, magnetically shielded pyrometer gives fast, precise temperature reading to production men in all industries. Choice of ten scale ranges, 0-400° to 0-3000°F. Automatic cold end compensator is standard equipment.

Alnor®

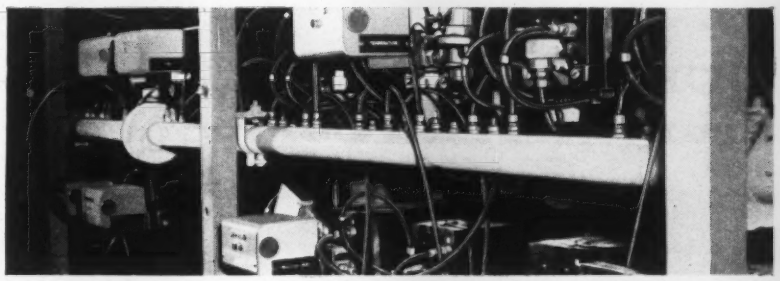
ILLINOIS TESTING LABORATORIES, INC.
Room 537, 420 N. LaSalle St. • Chicago 10, Illinois

PRECISION INSTRUMENTS FOR EVERY INDUSTRY

CIRCLE 7 ON READER-SERVICE CARD

IMPERIAL Engineering and Data File

ENGINEERED TUBE FITTINGS — VALVES — TUBING TOOLS



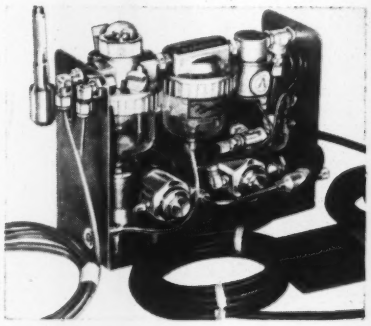
How Poly-Flo tube fittings cut installation costs, save space, eliminate bending

IMPERIAL'S Poly-Flo Fitting and Tubing now offer creative engineers a practical, low-cost solution to a wide range of tough jobs. The following case histories demonstrate typical Imperial product savings:

PROBLEM No. 1: High installation cost. Copper tubing cost $2.10 per ft. to install on an instrument panel for one Eastern Chemical plant. Further, chemical corrosion created high replacement costs.

SOLUTION No. 1: For an identical panel where polyethylene tubing and Poly-Flo Fittings were used, labor costs were slashed to 14½¢ a foot . . . a savings of 93%. Poly-Flo Tubing is also impervious to most chemicals, creating extra savings.

Sensational savings in time and labor — as with this documented example — are typical when you choose Poly-Flo. Remember, you need only a pocket knife to cut the tubing to exact length.

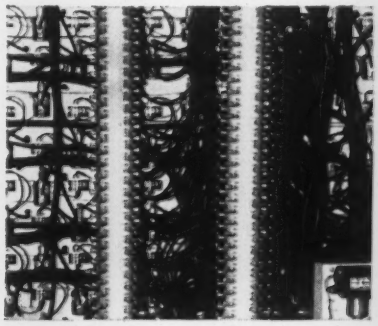


PROBLEM No. 2: Limited work space was encountered in assembling this dental equipment, designed by Aero Turbex. This equipment operates at speeds in excess of 250,000 rpm.

SOLUTION No. 2: Poly-Flo Tubing and Fittings beat this problem because no wrenches are needed for installation. Nut is just finger tightened, providing a connection that withstands the burst pressure of the Poly-Flo Tubing—from 250 to 600 psi.

Even in extremely close quarters **if you can reach the area with your fingers, you can make a foolproof connection.**

Tubing can be used in a temperature range from −90° to +175° F. Also, Poly-Flo is non-toxic, odorless and tasteless, an important consideration on food and medical equipment.



PROBLEM No. 3: Elimination of Tube Bending. Shown above is a Pressure Comparator Cabinet for an automatic data logging system. Because hundreds of tube bends were needed to complete the job, metal tubing costs were unduly high.

SOLUTION No. 3: Poly-Flo is so flexible, no time is wasted bending the tubing to fit. Tubing bends readily by hand. No special tools, either.

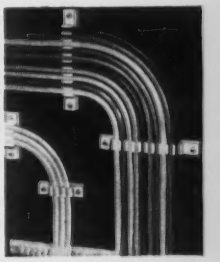
This tubing is ideal for smallest areas, too. For example, ¼" Poly-Flo tubing can be bent a full 360° to form a ⅞" radius circle *with no apparent constriction or collapsing of tube walls.*

Tubing is available in nine colors — color coding quickly identifies circuits. Sizes of tubing are: ¼" O.D., .040" wall; 5/16" O.D., .062" wall; ⅜" O.D., .062" wall; and ½" O.D., .062" wall.

CIRCLE 8 ON READER-SERVICE CARD

Plastic Tube Rack Speeds Poly-Flo Tubing Installations

Holds from 1 to 10 plastic or metal tubes. Rack is especially convenient for holding bends in Polyethylene, Nylon and other plastic tubing. For use on panels, instrument boards and other installations where a number of tubes are involved. Cuts installation time — assures a neater appearance.



Rack can be cut quickly with a knife. Furnished in natural color Polyethylene.

Write for Engineering File No. 3025.

Fluid Control Valves for Every Application

Whenever you have an application calling for fluid control valves — check on Imperial's complete, quality line. Whether the job calls for needle valves, toggle valves, 2-, 3-, or 4-way plug valves or diaphragm valves, Imperial can provide the right valve to meet your requirements.

Write for Catalog No. 200.

THE IMPERIAL BRASS MFG. CO.

Dept. ICS-109, 6300 W. Howard St., Chicago 48, Ill.

In Canada: 18 Hook Ave., Toronto, Ontario

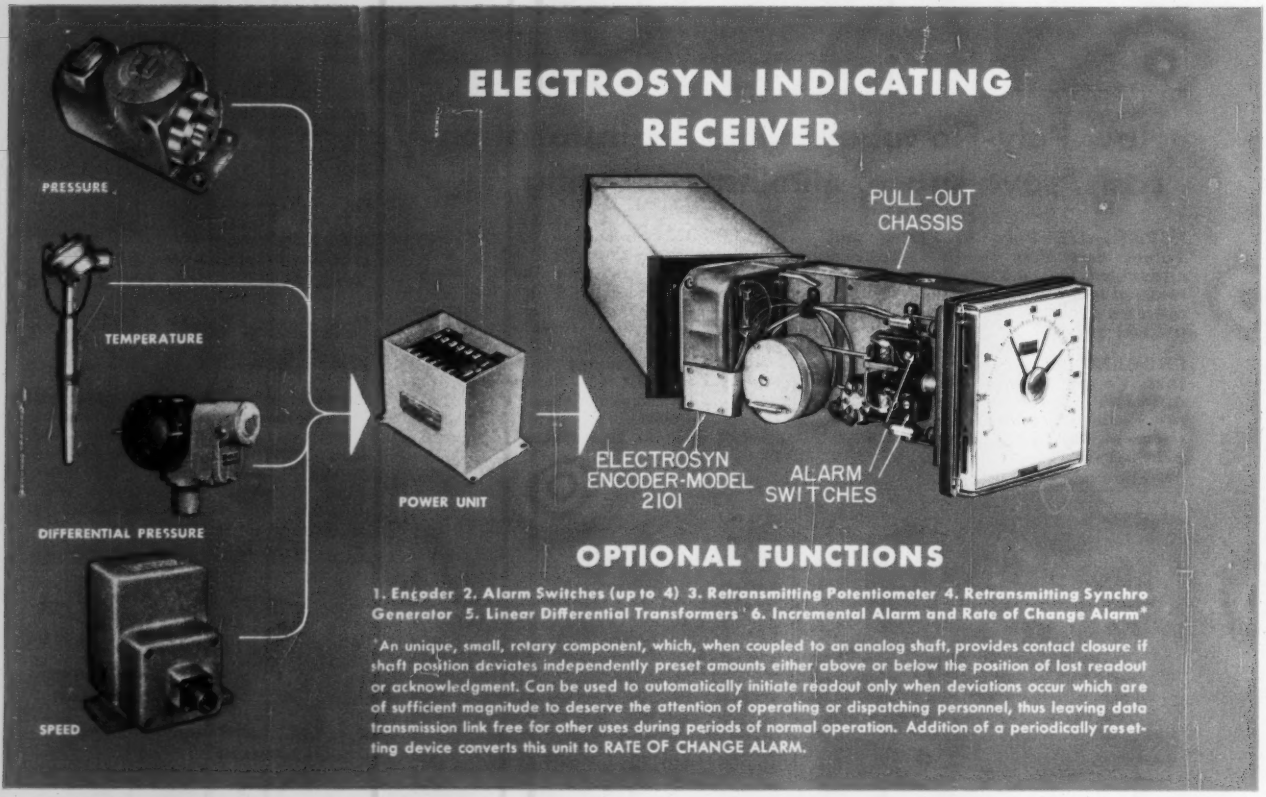
IMPERIAL

FIRST NAME IN FLUID TRANSMISSION COMPONENTS

HIGH RELIABILITY
LOW MAINTENANCE

NORWOOD CONTROLS

PROCESS and TELEMETRY Instruments and Components


ELECTROSYN INDICATING RECEIVER
PRESSURE
TEMPERATURE
DIFFERENTIAL PRESSURE
SPEED
POWER UNIT
PULL-OUT CHASSIS
ELECTROSYN ENCODER-MODEL 2101
ALARM SWITCHES
OPTIONAL FUNCTIONS
1. Encoder 2. Alarm Switches (up to 4) 3. Retransmitting Potentiometer 4. Retransmitting Synchro Generator 5. Linear Differential Transformers 6. Incremental Alarm and Rate of Change Alarm*
*An unique, small, rotary component, which, when coupled to an analog shaft, provides contact closure if shaft position deviates independently preset amounts either above or below the position of last readout or acknowledgment. Can be used to automatically initiate readout only when deviations occur which are of sufficient magnitude to deserve the attention of operating or dispatching personnel, thus leaving data transmission link free for other uses during periods of normal operation. Addition of a periodically resetting device converts this unit to RATE OF CHANGE ALARM.

Norwood Controls' ElectroSyn is a highly flexible, rugged electro-magnetic system for a wide range of applications in the chemical processing, atomic power, natural gas and petroleum transmission fields. It is designed to measure, indicate, record (including analog to digital conversions), or control a wide range of process variables. (Pressure, differential pressure, flow, level, temperature.)

Error signal is amplified by a magnetic servo-amplifier (which can be located up to 4 miles from transmitter). Signal voltage is compared with output from a servo-motor driven feedback ElectroSyn Signal Generator. Pointer on indicator turns until signal and feedback balance and then entire system ceases to move until next transducer signal change.

Also available as alternate systems: transistorized servo-indicator which performs same functions as magnetic amplifier system (illustrated above) and a low-cost meter readout system for either pressure or differential pressure when only indication of the variable is required.

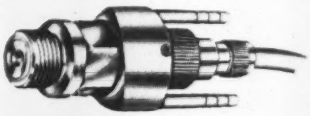
These three systems offer a price range in keeping with the economics of most any application.

Write for ElectroSyn Bulletin B258C

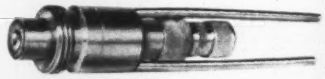
NORWOOD CONTROLS

STRAIN GAGE

PRESSURE TRANSDUCERS



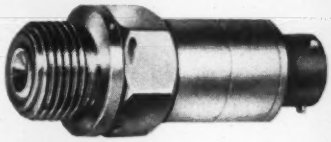
Models 108, 109 and 110



Model 113

WATER COOLED PRESSURE TRANSDUCERS

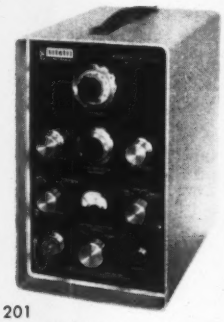
Models 108, 109, 110 and 113 water-cooled, high frequency transducers for pressure studies under very high temperatures. Can be exposed to gas temperatures above 5000 F without damage. All-welded construction for any applications, including highly corrosive liquids and propellants. Ranges: 0-500, 0-1000, 0-2000, 0-3000 and 0-5000 psi.



Model 111A

AIRBORNE PRESSURE TRANSDUCER

Specially constructed unit with features designed for high altitude flight service applications, such as 1000 volt insulation of electrical components for proper performance with vacuum ambient.



Model 201

PRESSURE MONITOR

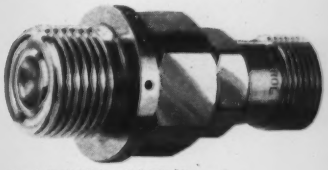
Amplifies 2-arm transducer output signal for oscilloscope display. Internal, manually-operated calibration provisions included, or may be equipped with external Model 203 Automatic Calibrator. Write for Technical Data Sheet A159-5.

- **High frequency response: flat from 0-20,000 cps.**
- **Bonded strain gage (rugged, low inertia, high stiffness) sensing element.**
- **Adaptable to virtually all strain gage amplification and readout equipment.**
- **Widest range of any pressure transducers on the market: ranges 0-25 to 0-100,000 psi.**
- **Widest temperature range: 0-250 F with air-cooled transducers (0-800 F with Plastics Transducers); 0-5000 F with water-cooled transducers.**
- **For both dynamic and static measurements without special equipment (which is required with crystal-type transducers). Ideal for internal combustion and rocket engine studies and pressure measurements in various high temperature processes, including plastic extrusion.**
- **Silver soldered or, for corrosive applications, all-welded catenary diaphragms.**
- **Insensitive to humidity (unlike crystal-type transducers).**
- **2-arm 4-pin and 2-arm 3-pin bridges.**
- **350 ohm 4-arm 4-pin standard and compensated bridges.**
- **Comprehensive, prompt repair service at minimum cost — no longer must you consider transducers expendable.**
- **High output signal.**
- **Custom designs for special requirements.**

Model 175

PLASTICS PRESSURE TRANSDUCER

New, one-piece, flush diaphragm, bonded strain gage type of pressure transducer, suitable for use in plastics extruders and other equipment where process temperatures approach 800 F and cooling of process fluid is not permissible. Standardized dimensions for extruder mounting.



Models 101 and 102 (2-arm), 111 and 112 (4-arm)

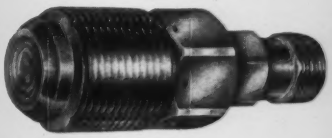
STANDARD PRESSURE TRANSDUCERS

Highly accurate, versatile transducers for dynamic pressure measurements requiring high frequency response (flat from 0-20,000 cps). Ranges from 0-100 up to 15,000 psi.

Model 103

MINIATURIZED PRESSURE TRANSDUCERS

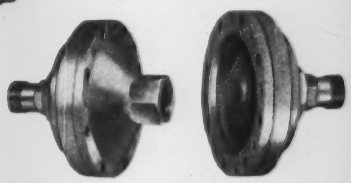
Miniaturized unit designed for applications where small size is a prime requisite. St'd threads 10-1.0 mm or $\frac{3}{8}$"-24 are provided. High frequency response flat from 0-20,000 cps. Ranges: 1,000, 2,000, 3,000, 5,000 and 7,000 psi.



Model 104

HIGH PRESSURE TRANSDUCERS

For high pressure applications in blast analyses, gun barrel pressures, hydraulic high pressures, etc. Frequency response; flat from 0-20,000 cps. Ranges from 0-20,000 to 0-100,000 psi.



Model 105 Model 106

LOW PRESSURE TRANSDUCERS

For pressure ranges 0-25 and 0-50 psig. Utilize same strain tube assembly as models above. May be used under conditions of extreme vibration as encountered in measuring shock waves in open air.

For detailed specifications write for Data Sheets A259 and A158-1:
Norwood Controls Unit, Detroit Controls Division, 5900 Trumbull Avenue, Detroit 8, Mich.

AMERICAN-Standard PRODUCTS

AMERICAN-Standard

DETROIT CONTROLS DIVISION

CIRCLE 9 ON READER-SERVICE CARD

For All ELECTRONIC SYSTEMS, APPLICATIONS: AIRBORNE or GROUND-BASED

the A. W. HAYDON COMPANY

offers a complete line of

TIMING DEVICES

ALTERNATING AND DIRECT CURRENT

Tough & Tiny
Sub-Miniatures
Rugged & Reliable
Electronics
Time-Proven
Electro-mechanicals

PRECISION TIMING MOTORS

Repeat Cycle Timers
Time Delay Relays
Stop Clocks
Intervalometers
Coding Devices

ELECTRO MECHANICAL AND ELECTRONIC TIMING DEVICES

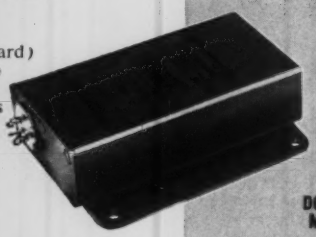
REPEAT CYCLE TIMERS

— 3" long (Typical)
— 6½ ounces basic
— 1-8 switches (Standard)
— Cycle Time 5 sec to 90 Min.
— Loads to 5 Amperes

Write for Bulletin AWH RC-301

SUB-MINIATURE ELECTRO-MECHANICAL TIMING DEVICES

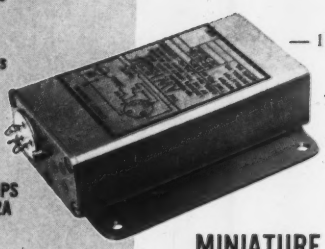
Features
Hermetically Sealed Housings
¼ Size
— ½ Weight of Standard Designs
1 x 2 Cross-Section
DC, 60 or 400 CPS
Meet MIL-E-5272A



TIME DELAY RELAYS

— 3" long (Typical)
— 7½ ounces basic
— 1-3 switches (Standard)
— Time Delays
— 25 Sec. to 3 Hours
— Loads to 5 Amperes

Write for Bulletin AWH TD-502



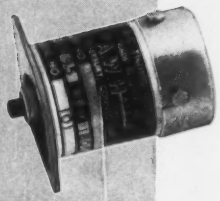
ELAPSED TIME INDICATORS

— Sub-Miniature — Hermetically Sealed
— 1¼" Diameter — 2⅞" Long (max.)
— 3 Watts maximum power
— Digital or Dial Type
— 60 cps & 400 cps models cataloged
— DC Models Available
— Meet MIL-E-5272A MIL-M-7793B

Write for Bulletin
AWH ET-602 describes 400 cps models
AWH ET-603 describes 60 cps models

MINIATURE TIMING MOTORS

— Compact — High Performance
— 60 or 400 Cycle AC
— 15/16" Diameter — 1 7/32" long
— Direct Current
— 13/16" Diameter — 1 11/32" long
— Submit problem statement with motor requirements for recommendations



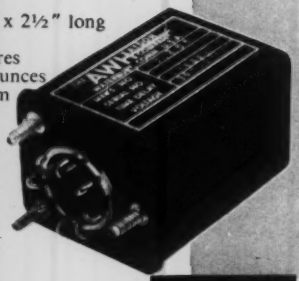
ELECTRONIC TIME DELAY RELAYS

Features
Hermetically Sealed Housings
Variety of Circuits
Temperature to 250°F
Vibration to 2000 cps, 15 g
Meet MIL-E-5272A
Unique Transistorized RC Time Constant network
Time Delays 50 MS to 120 sec.

Miniature Series

— 1 7/16" x 1 21/32" x 2½" long
— 1-4 SPDT contacts
— Loads to 10 Amperes
— Weight — only 6 ounces
— 5½ Watts maximum power

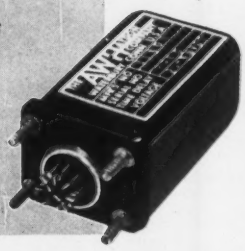
Write for Bulletin AWH TD-503



Sub-Miniature Series

— 31/32" x 1 3/16" x 2" long (max.)
— 1-2 SPDT contacts
— Loads to 8 Amperes
— Weight only 3 ounces
— 4 Watts maximum power

Write for Bulletin AWH TD-504



ALSO AVAILABLE

A Complete Line of timing devices and instruments for Military, Commercial & Industrial Applications.
Write for specific literature or complete catalog.

The A.W. HAYDON Company

224 NORTH ELM STREET, WATERBURY 20, CONNECTICUT

CUSTOM DESIGN & MANUFACTURE OF ELECTRONIC AND ELECTRO-MECHANICAL TIMING DEVICES

CIRCLE 10 ON READER-SERVICE CARD

PALMER a great name in thermometers

PALMER "DIRECT DRIVE" 3½" DIAL THERMOMETER

An outstanding improvement in mercury actuated dial thermometers with external calibration feature.

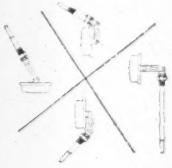
- No Sector
- No Pinion
- No Linkage
- Accuracy
- Readability
- Angularity

Case . . . stainless steel, compensated for ambient temperature, external calibrating feature. Cover . . . clear plastic, gasket-sealed to stainless steel back-plate. Actuation . . . direct drive Bourdon coil. (No sector, pinion or linkage.) Stem . . . ½" diameter stainless steel, standard lengths: 4"—6"—8"—12", multiples of 6" up to 60" max. . . . Fittings . . . separable socket, union connection (½" or ¾" NPT), flange union.

PALMER 4½" DIAL THERMOMETER

Adaptable and interchangeable with all Industrial Thermometer applications.

MERCURY-ACTUATED. Guaranteed accuracy. Size: 4½" Dial.

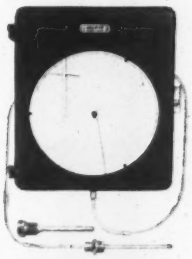


Designed for use as STRAIGHT or any ANGLE. With clear vision all-glass moulded case and metal back. Fittings: Plain, Union, Socket; adjustable or union Flanges.

STANDARD RANGES:

−30+130°F. 1°	0+300°F. 2°	0+600°F. 5°
0+150°F. 1°	0+400°F. 5°	+200+750°F. 5°
0+240°F. 2°	0+500°F. 5°	+200+950°F. 5°

or equivalent °C—no extra charge

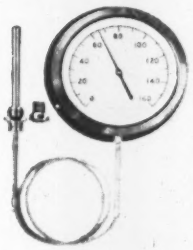


RECORDING and DIAL THERMOMETERS

With Flexible Tubing Connection.

Mercury-actuated, for extreme accuracy. Sturdy construction, very sensitive. All parts rust-proof. Stainless-steel bulb. Wall or Flush Mounting. Bottom or Back connection. Fittings: Plain, Union, Sep. socket; Adj. or Union Flanges.

Ranges: —40 to 1000°F. (or C).

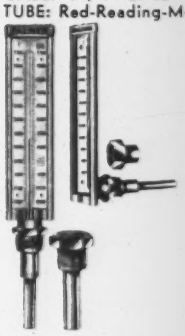


RECORDER: 12" die-cast alum. case; Black or white, satin or wrinkle finish; elec. or spring clock; 12 hr., 24 hr., or 7-day charts. One-pen or multiple pens. Also Fully compensated to correct for Ambient Temperature.

DIAL: 6" and 8" round case. Black or white finish. Easy-reading dial.

INDUSTRIAL THERMOMETERS with "Red-Reading-Mercury"

CASE: 7", 9" or 12" Extruded brass. Wide scale. Chrome finish.
TUBE: Red-Reading-Mercury Easy to Read. Thoroughly annealed for permanent accuracy. Protected by double-strength glass shield. Graduated scale.



Straight

FITTINGS: Fixed thrd., Union, Sep. Socket; adjustable or union Flange; parallel thrd. & locknut; special fttgs. to order.

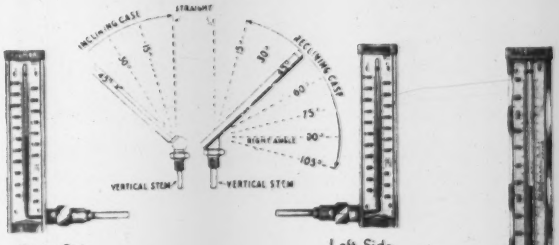
STEM: STRAIGHT and Misc. ANGLES. 3½" to 60", incl. thread.

THREAD: ¾" or 1" NPT (½" not recom.)

STANDARD RANGES:

−40+110°F	2°	+ 50+400°F	5°		
0+100°F	1°	+100+550°F	5°		
+30+180°F	2°	+200+750°F	5°		
+30+240°F	2°	+200+950°F	5°		
+30+300°F	2°				

Plain Mercury. Borosilicate tube. Centrigrade equiv.—no extra. Spec. Ranges—cost more.



Right Side

Left Side

SMALL CASE THERMOMETERS

4" case ⅜" & ½" Fixed Thrd. Fttg.
6" case: ½" & ¾" Sep. Socket Fttg.
Extruded case. Durable Nickel finish.
"Red-Reading-Mercury". Guaranteed accurate.

LABORATORY AND PRECISION THERMOMETERS

All glass engraved mercury tube, with vivid RED column. Round or lens; Ring or button top; With or without metal armor; Total or partial Immersion (3" standard). Each in sep. box. All ranges: up to 750°F. (or C. equiv.).
Plain mercury. Borosilicate tube. +200+950°F. Special ranges & dimensions to order. Fractional division, A.S.T.M. etc.
Also handy 5" Pocket style. Annealed and guaranteed very accurate.

REPAIRS—To all makes of mercury Industrial Thermometers. With "Red-Reading-Mercury" (no extra cost) and new Extruded Brass case included. Guaranteed accurate. Reasonable price.

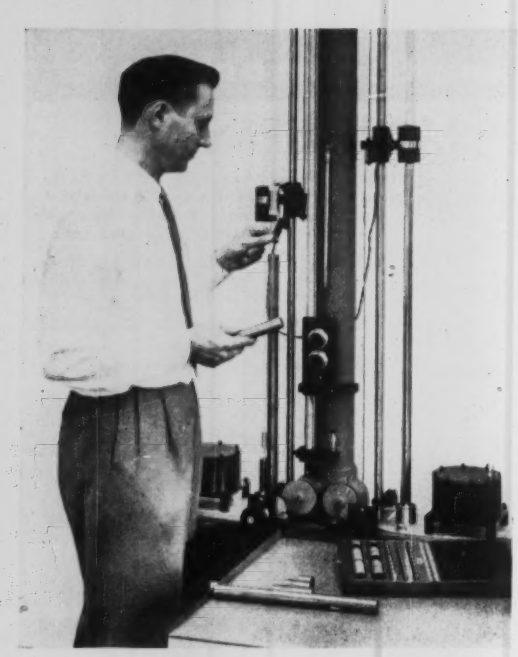
PALMER THERMOMETERS, INC.

Mfrs. of Industrial Laboratory, Recording and Dial Thermometers

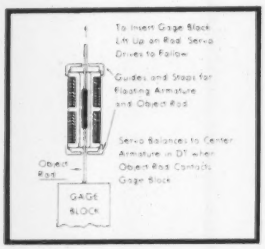
2518 NORWOOD AVE., CINCINNATI 12, O.

CANADIAN PLANT: PALMER THERMOMETER LTD., TORONTO. 2

CIRCLE 11 ON READER-SERVICE CARD



Exactel Servomanometers emphasize calibration proving provisions in precision pressure measurement

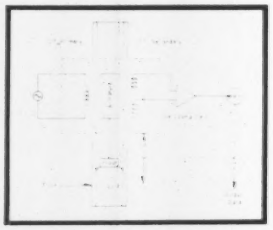


Several years of experience and a great deal of statistical data have now been accumulated on the use and reliability of Exactel's verifying techniques. Customers have been able to prove accuracies of one part in 20 to 50 thousand. For example, three 120 inch range Servomanometers, and a fourth operating as a standard, were recently calibrated in parallel with maximum deviation of 0.004". The calibration proving facilities established the absolute accuracy of the values within this limit.

Exactel instruments may be supplied with three basic provisions for checking and proving of calibrations. The combination of techniques provides a true primary standard wherein the calibration is based upon as well as proved by cgs standards.

The calibration proving provisions, available singly or in total, permit verification of the mechanical accuracy of the follower and readout mechanism, ability of the instrument to read true liquid column height and determination of error in temperature compensation. The methods are described in Exactel Bulletin 500.

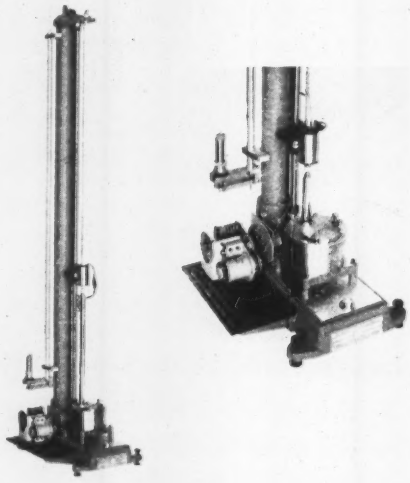
Mechanical accuracy, for example, is proved by the following technique: A second differential transformer mounted on the carriage is equipped with an armature mounted on an "object rod" that is free to float vertically except as guided and restrained by Nylon end bushings. The DT has a connector that may be plugged into the line that ordinarily goes to the DT that senses the float. When the calibration proof DT is used, the servo drives in a direction tending to center the armature when the bottom of the object rod contacts a solid object, normally the base of the instrument serving as a reference surface or the top of a Jo block. Thus by installing Jo blocks and allowing the servo to balance, the overall mechanism may be easily calibrated in a matter of minutes. The height of the stack of Jo blocks is read on the counter (with the inclusion of correction for cistern drop at a known ratio). This particular proving facility, originally offered as an optional feature, has proved so reliable and popular it is now being included as standard equipment.



The basic Exactel principle.

A differential transformer (DT) is continuously positioned by a servo to be electrically centered about a float containing magnetic material. A proportional shaft position in the servo transmission is then analogous to the position of the liquid column.

Illustrated at right is uncabineted Model 560IN-D with Analog Temperature Compensation, calibration proving provision, synchro output, counter and area for mounting auxiliary readout and control devices. The lower end of the tube passes through the top of the cistern and terminates beneath the manometer liquid. This constuction is virtually leakproof, provides improved liquid column response, permits removal of the tube without draining instruments, avoids pockets of trapped air that can compress under pressure and offers several other operating advantages. This is one of 38 standard models available in single or dual instrument construction. Many optional features are available, including use of stainless steel manometer tubes and high pressure construction, choice of any liquid and variations in calibration units and servo characteristics.



"Servomanometer" and "Analog Temperature Compensation" are trade names of Exactel Instrument Company.

EXACTEL INSTRUMENT COMPANY
185 Evelyn Avenue • Mountain View, California
YOrkshire 8-6558

CIRCLE 12 ON READER-SERVICE CARD

JOHNSON PNEUMATIC CONTROL

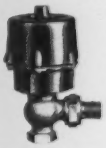
For Processing • Heating • Cooling Humidifying • Dehumidifying Ventilating • Air Conditioning

PROCESS CONTROL. Automatic temperature and humidity control for a wide range of manufacturing and industrial process applications. Thermostats, special controllers, valves and dampers applied to tanks, dryers, vats, kettles, curing rooms, coolers, kilns, ovens and other processing equipment.

SPACE CONTROL. Automatic control of room temperature and humidities applied to radiators, radiant heating, unit ventilators, unit heaters and heat delivery ducts. Johnson equipment includes a complete line of thermostats, thermometers, pressure regulators, humidostats, humidifiers, valves, dampers, damper operators, switches, special controllers and related apparatus.

NATIONWIDE SERVICE. Johnson's own full time engineers and installation men are available at branch offices across the nation. Whether your problem involves a complete system or merely a single controller, take advantage of Johnson's over 73 years' experience in solving all types of control problems.

DIAPHRAGM VALVES FOR STEAM AND LIQUIDS



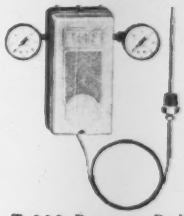
V-153 Sylphon Diaphragm Valve for low pressure steam. Sizes ½" and ¾". *Send for Bulletin V-153.*

V-103 N.O. Globe Valve. ½" to 8" sizes. *Send for Bulletin V-103.*

3-Way Valves for mixing and by-pass applications. 100% tight-closing design. Can be serviced without removal from line. Sizes 2½" to 6". 125 and 250 lb. standard construction. *Send for Bulletins V-211 (By-Pass) and V-214 (Mixing).*

V-111 Sylphon Radiator Valve for low pressure steam. Sizes ½" to 2". *Send for Bulletin V-111.*

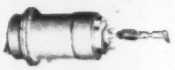
MASTER-SUBMASTER CONTROL FOR STEAM, LIQUIDS OR AIR



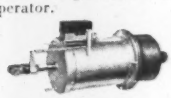
T-900 Remote Bulb Master Thermostat. *Send for Bulletin T-900.*

T-901 Remote Bulb Submaster Thermostat. *Send for Bulletin T-901.*

PISTON OPERATORS, PILOT POSITIONERS



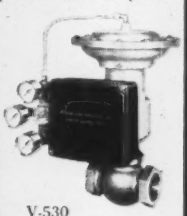
D-251 Long-Stroke Piston Operator.



Pilot Positioner Applied to Piston Damper Operator.

Piston Operators for dampers and similar uses. Compact with fully enclosed spring and rubber diaphragm. Adjustable stops. Available with pilot positioner for applications requiring maximum and precise repositioning power. *Send for Bulletins D-251 and D-265.*

V-530 Precision Pilot Positioner. Powerful, precise! Responds to slightest change in air pressure. Acts 6 times faster than ordinary pilots. Consumes no more air than a room thermostat. *Send for Bulletin V-530.*



V-530 Precision Pilot Positioner applied to valve.

RECORDING AND INDICATING CONTROLLERS FOR TEMPERATURE, PRESSURE, HUMIDITY

T-1000 Record-O-Stat. Records and controls. Built for extreme accuracy under all conditions. Single and two-pen models. Liquid-filled, vapor tension or gas-filled thermal systems. For ranges between minus 125 F and plus 1000 F. Charts for 24 hours or 7 days. *Send for Bulletin T-1000.*

R-1051 Static Pressure Indicator-Controller. Controls at a pressure range as low as 0 to 0.2 in. of water. Extremely accurate for either static or differential pressure control. *Send for Bulletin R-1051.*

THERMOSTATS

T-403 Single Temperature Room Thermostat. *Send for Bulletin T-403.*

T-432 Heating-Cooling Room Thermostat. *Send for Bulletin T-432.*

Series T-800 Thermostats for steam, liquids or air. Proportional or two-position action. Furnished with remote bulb for liquids or air; rigid stem models for insertion or immersion. Separable sockets available. *Send for Bulletin T-800*

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

JOHNSON SERVICE COMPANY

507-PP East Michigan Street, Milwaukee 1, Wisconsin

Please send me the following free Product Bulletins:

☐ V-153 ☐ V-211 ☐ V-111 ☐ T-901 ☐ D-265 ☐ T-1000 ☐ T-403 ☐ T-800
☐ V-103 ☐ V-214 ☐ T-900 ☐ D-251 ☐ V-530 ☐ R-1051 ☐ T-432
☐ *New Condensed Catalog of all Johnson Products.*

Name_____

Firm_____

Address_____

City & State_____

CIRCLE 13 ON READER-SERVICE CARD

Bul. F-100
Where cooling water is not available

Bul. 103
For dead end and low flow service

Bul. 4158
Integrated filter, dehydrator, separator, trap

Bul. 501C
Efficient, automatic condensate discharge

Hankison

**COLLEGE & PIKE
CANONSBURG, PA.**

CIRCLE 14 ON READER-SERVICE CARD

AIR CLEANERS, Instrument
Adams Co R P
Air Maze Corp
Conoflow
Gas Drying Inc
Gelman Instrument
Hankison Corp
Kahn & Co
Kieley & Mueller
Phoenix Precision Instr
Pittsburgh Lectrodryer
Radex Corp
Robbins Aviation Inc
Selas Corp of America
Trinity Equipment

AIR COMPRESSORS, Instrument
Air-Shields Inc
Chemiquip
Johnson Service Co
Kahn & Co
Leiman Bros Inc
Nash Engineering
Penna Pump & Compressor
Sterling Precision

BEARING TEMPERATURE INSTRUMENTS, including Alarm
Aero Research Instr
Assembly Products Inc
Atkins Technical Inc
Burling Instrument
Edison Industries T A
Electro Devices (Mo)
Fenwal Inc
Foxboro Company
GE Apparatus Sales Div
Gilmore Industries
Illinois Testing Labs
Leeds & Northrup
M-H Brown Instrs Div
Moeller Instr
Murphy Mfg Inc
Nanmac Corp
Panellit Inc
Pyrometer Instr Co
Royco Instruments Inc
Thermo Electric
United Electric Controls
Victory Engrg Corp
Weksler Instruments
West Instrument
Weston Instruments
Westronics Inc
Winslow Company Inc

BOILER ROOM INSTRUMENTS, including Condenser Leakage, Damper, Desuperheat, Draft, Feedwater, Specialties, Steam, Stoker, etc. (see also Combustion Safeguards, also Gas Analyzers)
Bacharach Indus Instr
Bin-Dicator Co

BAILEY MULTI-POINTER GAGE UNIT

• Provides two large, easily-read 7-inch vertical gages in space only 4 inches wide. Multi-Pointer Gage Units may: (1) measure and indicate draft, pressure, differential pressure, and level; (2) transmit these variables either pneumatically or electrically to remote indicators, recorders, and/or controllers; or (3) receive and indicate any measured variables which may be transmitted pneumatically by standard SAMA ranges of 3-15 psig or 3-27 psig.

Any number of basic two-indicator units may be placed side-by-side to provide indications of related factors. Each two-indicator unit is separately mounted.

Standard ranges from 0-0.5 in. H_2O to 0-5000 psig are available.

Request Product Specifications M42-2.

BAILEY METER COMPANY
1041 IVANHOE ROAD CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 17 ON READER-SERVICE CARD

BAILEY BOILER METER

Steam Flow—Air Flow Ratio Meter

• This dependable and accurate guide to maximum combustion economy is easily understood and followed by operators. It indicates, records, and integrates Steam Flow from the boiler, records Air Flow supplied for combustion, and records Flue Gas Temperature.

Best combustion efficiency is secured by keeping the Steam Flow and Air Flow pens together so that the records coincide. The record of the Flue Gas Temperature when compared with that of Steam Flow shows the condition of baffles and tubes, and indicates heat absorption efficiency.

The **Bailey Boiler Meter** reduces fuel costs, lessens maintenance and outage, lowers standby costs, and adds capacity. It is suitable for boilers of 100 hp or more and for all types of fuels.

To obtain maximum benefit from the **Bailey Boiler Meter,** it should be made an integral part of a Bailey Combustion Control System so that combustion losses are automatically corrected as they tend to appear.

Request Product Specification M61-1.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 15 ON READER-SERVICE CARD

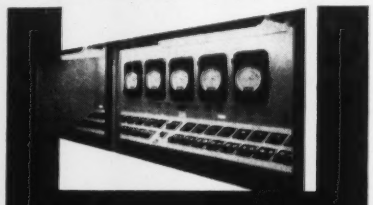
BOILER ROOM INSTRUMENTS

- Electrolytic conductivity apparatus for steam and condensate degassing.
- Boiler Feedwater measurements.
- A complete line of recording instruments available in line and battery powered models.
- Salinity detecting and controlling equipment.
- Condenser leakage detectors.

Write for complete catalog

Industrial Instruments Inc
89 Commerce Road Cedar Grove Essex County N J

CIRCLE 16 ON READER-SERVICE CARD



HAGAN COMBUSTION CONTROLS

Hagan pneumatic or solid state electronic combustion control systems give the ultimate in accurate, dependable control. Hagan systems include basic combustion control, 3-element feedwater control, pump recirculation control and steam temperature control.

Hagan systems, on both central station and industrial boilers, have established records for economy, reliability and very low maintenance costs.

HAGAN CHEMICALS & CONTROLS, INC.
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 18 ON READER-SERVICE CARD

HAGAN FEED WATER CONTROL

The Hagan system of 3-element feed water control is compensated for variations in fluid density, a feature not available in most systems.

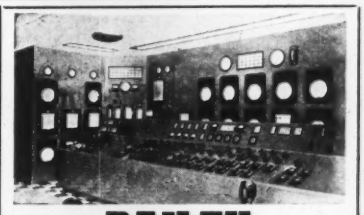
In addition, the system is automatically compensated for discrepancies between steam generated and steam measured. This means drum level is held at set point, even during blowdown or steam soot-blowing.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 19 ON READER-SERVICE CARD



BAILEY *Combustion* CONTROL

● Bailey Automatic Combustion Control results in substantial savings in fuel; increased boiler capacity; reduction of boiler and furnace maintenance; more time for operators to devote to general station maintenance; and improvement in the general character of service.

Bailey Automatic Combustion Control makes possible the every day operation of boilers at test efficiencies, because it is a COMPLETE combustion control system which: (1) automatically maintains steam pressure by supplying fuel and air simultaneously to boilers in accordance with changes in steam demand; (2) automatically maintains most economical fuel-air ratio by incorporating the **Bailey Boiler Meter** as an integral part of the system; (3) automatically maintains the desired furnace draft; and (4) automatically distributes load among boilers so that each unit carries its share.

This sturdy, inexpensive, air-operated control system has been applied to all sizes and types of boilers ranging from 200 hp upward. It is applicable to all fuels and all methods of firing.

Request Bulletin 515 and Bulletin 1023.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd.: Montreal, Canada

CIRCLE 20 ON READER-SERVICE CARD

Exactel Instrument
Magnetrol Inc
Bailey Co Chas M
Bailey Meter Co
Barber-Colman
Chemiquip
Defender Instrument
Diamond Power Specialty
Ellison Draft Gage
GPE Controls
General Controls
Hagan Chem & Controls
Hays Corporation
Industrial Instruments
Leeds & Northrup
Mason Neilan
McDonnell & Miller
Meriam Instr Co
Mine Safety Appliances
M-H Rubicon Instrs Div
North American Mfg
Photomation Inc
Powers Regulator
Pyrometer Instr Co
Ranarex Div
Reliance Instr Mfg
Thermco Instrument
Uehling Instrument
Victory Engrg Corp
Warrick Co Chas F
Weksler Instruments
Weston Instruments
Westronics Inc

B.T.U. INDICATORS

Air Conditioning Equip
American Meter Co
Bailey Meter Co
Foxboro Company
Hagan Chem & Controls
Hays Corporation
Westronics Inc

CHEMICAL FEEDERS, Dry and Liquid

American Meter Co
B-I-F Industries
Clark-Cooper
Exline Engrg
Fischer & Porter Co
Fuller Co
Gump Co B F
Hills-McGanna
Lapp Insulator
Loe Engrg Co
Milton Roy Co
Natl Instrument Co
Research Appliance Co
Richardson Scale Co
Syntron Co
Thayer Scale Corp
Wallace & Tiernan
Weighing & Control Comps

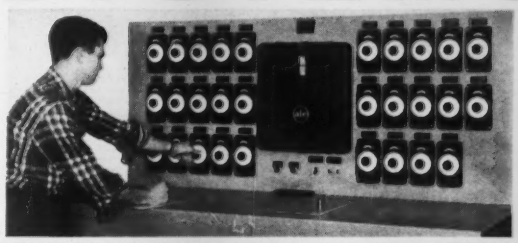
CLOCKS, Master or Primary

Alina Corp
American Electronics Inc
American Meter Co
Cincinnati Time Recorder
Edwards Co Inc
Electro Instruments
General Radio
Hamilton Watch Co
Natl Time & Signal
Standard Electric Time
Stromberg Time Corp
Times Facsimile

CLOCKS, Minute Impulse and Synchronous

Alina Corp
Anadex Instruments Inc
Chrono-Log Corp
Cincinnati Time Recorder
Cramer Controls
Edwards Co Inc
Electro Instruments
General Controls
Haydon Instrument
Micronics Div
Natl Time & Signal
Parabam Inc
Photocon Research
Standard Electric Time
Stromberg Time Corp
Sunshine Scientific
Thompson Clock Co
Times Facsimile
United Electrodynamics
Wang Laboratories

CONTROL SYSTEMS

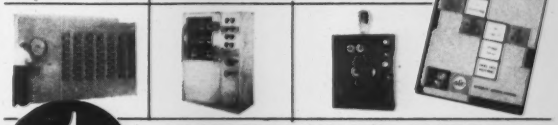


ELECTRONIC • PNEUMATIC • HYDRAULIC • ELECTRO-MECHANICAL

To realize economy, efficiency and higher plant profits, management is looking more and more to correctly applied automatic control.

Backed by years of research and field experience, ATC is uniquely equipped to help you in the design and manufacture of complete control systems for machines and processes. Full familiarity for execution to industry standards such as JIC, NEMA, etc.

WRITE FOR BULLETIN NO. S-10



atc **AUTOMATIC TIMING & CONTROLS, INC.**
KING OF PRUSSIA, PENNA.
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

CIRCLE 21 ON READER-SERVICE CARD

CLOCKS, Secondary

Alina Corp
Cincinnati Time Recorder
Edwards Co Inc
Geotechnical Corp
Hamilton Watch Co
Micronics Div
Natl Time & Signal
P I C Design Corp
Standard Electric Time
Stromberg Time Corp

CLOCKS, Standard

Alina Corp
Cincinnati Time Recorder
Edwards Co Inc
General Radio
Geotechnical Corp
Hamilton Watch Co
Hewlett-Packard
Natl Time & Signal
Research Controls
Rockwell Mfg Co
Standard Electric Time
Stromberg Time Corp

CLOCKS, Stop

Alina Corp
Burke & James
Cramer Controls
Ducommun Co M
Hamilton Watch Co
Haydon Co A W
Micronics Div
Standard Electric Time
Thompson Clock Co

COMBUSTION CONTROL EQUIPMENT (see also Boiler Room Instruments)

Automatic Switch Co
Bailey Meter Co
Cash Co A W
Defender Instrument
Diamond Power Specialty
Eclipse Fuel Engrg
Ellison Draft Gage
Foxboro Company
General Controls
General Regulator
GPE Controls
Hagan Chem & Controls
Hays Corporation
Kieley & Mueller
Leeds & Northrup
North American Mfg
Partlow Corp
Photomation Inc
Pyrometer Instr Co
Ranarex Div
Reliance Instr Mfg
Selas Corp of America
Victory Engrg Corp
Weston Instruments
Westronics Inc
Worner Electronic Devices

COMBUSTION SAFEGUARDS, including Flame Failure

Bailey Meter Co
Barber-Colman
Crump Instrument
Dage Television
Diamond Power Specialty
Dietz Co Henry G
Eclipse Fuel Engrg
Edison Industries T A
Energy Controls
Falcon Alarm Co
General Controls
General Regulator
McIlvaine O T
Partlow Corp
Photomation Inc
Ranarex Div
Reliance Instr Mfg
Selas Corp of America

CONSISTENCY REGULATORS, Pulp and Paper

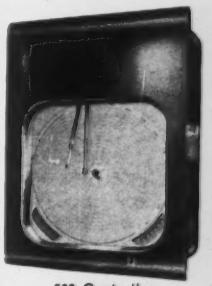
Brabender Instr C W
Cash Valve Mfg
Curtiss Wright
Dezurik Corp

Automatic Controllers

Bristol Controllers are made in a wide variety of models including air-operated, electronic, and electric types.

Five kinds of control action: on-off, proportional, reset, derivative, and reset plus derivative, also autoset and cascade controllers, ratio controllers, pneumatic transmission, miniature instruments, program controllers, electronic potentiometers. For temperatures up to 4000F, pressure, absolute pressure, vacuum, draft, liquid level, flow, pH, humidity, time cycle and program, and control panels.

Write for Bulletins A130, DM050, A115, B226, and C305.



500 Controller Series

BRISTOL COMPANY
112 Bristol Rd., Waterbury 20, Conn.

CIRCLE 22 ON READER-SERVICE CARD

For all types of process control systems, Hagan PowrMag (magnetic amplifier) analog computer control offers high stability, simplified construction and compatibility with data processing equipment.

- All solid state—no tubes or transistors.
- Interchangeable plug-in modular elements—no stocking problems.
- Rate, proportional band, reset action —all other computer functions built-in.
- Space saving panel stations—easy to maintain.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 23 ON READER-SERVICE CARD

Fischer & Porter Co
General Regulator

CONTROL SYSTEMS, General-purpose, Air-operated

American Meter Co
Astra Technical Instr
Automatic Timing & Contls
B-I-F Industries
Bailey Co Chas M
Bailey Meter Co
Berneo Engrg Corp
Black, Sivalls & Bryson
Bristol Co
Brooks Rotameter
Cash Co A W
Cash Valve Mfg
Chemiquip
Conoflow
Control Panel Corp
Designers For Industry
Fisher Governor
Foxboro Company
Fulton Syphon Div
General Regulator
Hagan Chem & Controls
Industrial Engrg Corp
Johnson Service Co
Kieley & Mueller
Leslie Co
Mason Neilan
Mercoid Corp
M-H Brown Instr Div
Moore Products Co
Panellit Inc
Partlow Corp
Phoenix Precision Instr
Pneu-Hydro Valve
Powers Regulator
Ramsey Engrg Co
Reeves Pulley Co
Research Controls
Scientific Instrument
Specialties Inc
Tapco Group
Taylor Instrument
United Aircraft Prods
United Electric Controls
U S Electrical Motors
Universal Match
Weston Instruments

CONTROL SYSTEMS, General-purpose, Electrical or Electronic

Abrams Instrument
Advanced Research
Airborne Accessories
Airpax Electronics
Allen-Bradley
American Data Div
Amer Meas & Control
Anadex Instrument Inc
Analogue Controls Inc
Appalachian Electronic
Applied Science Corp
Assembly Products Inc
Astra Technical Instr
Automatic Electric
Automatic Switch Co
Automatic Timing & Contls
B-I-F Industries
Bailey Meter Co
Baldwin-Lima-Hamilton
Barber-Colman
Bendix Montrose Div
Berkeley Dynamics
Berneo Engrg Corp
Bin-Dicator Co
Blue M Electric
Bristol Co
Brooks Rotameter
Bulova Research
Burroughs Corp
Bush Associates G F
B/W Controllers
Cargill Detroit
Cash Valve Mfg
Cincinnati Time Recorder
Clark Controller
Computer Measurements
Conoflow
Consol Electrodynamics
Consolidated Systems
Control Panel Corp
Control Technology
Controls Co of Amer
Corbett Science Labs
Crump Instrument
Cunningham Son & Co
Curtiss-Wright IMI
Dalmotor Div
Datex Corp
Defender Instrument
Designers For Industry
Designs For Tomorrow
Detroit Controls
Deveo Engrg Inc
Diamond Power Specialty
Di/An Controls
DJECO
Donner Scientific
Dynapar Corp
Dynatronics Inc
Eagle Signal
Edison Industries T A
Electric Eye Equip
Electric Regulator
Electro Instruments
Electro Precision
Electro Products Labs
Electronic Associates
Electrosnap
Ellison Draft Gage
Energy Kontrols
Engelhard Industries
Epsco Inc
Fairfield Engrg
Femco Inc
Fenwal Inc
Ferranti Electric
Fischer & Porter Co
Fisher Governor
Foxboro Company
Fuller Co
GPE Controls
General Devices
GE Apparatus Sales Div
GE Specialty Controls
GE X-Ray Dept
General Railway Signal
General Regulator
Genesys Corp
Gulton Industries
Hagan Chem & Controls
Haledy Electronics
Haydon Co A W
Hays Corporation
Healy-Ruff Co
Heller Co Gerald K
Hermes Electronics
Houston Instrument
Hughes Products
Hydel Inc
Industrial Engrg Corp
Industrial Nucleonics
Johnson Service Co
Kahn & Co
Kavamil Co
Kearfott Co
Larson Instrument
Leach Corporation
Leeds & Northrup
Librascope Inc
Link Aviation
Machinery Electrification
MacLaren & Co F B
Magnavox Co
Manning Maxwell & Moore
McIlvaine O T
Mercoid Corp
Micro Gee Products
Microloc Corp
Milgo Electronic
M-H Aeronautical Div
M-H Brown Instrs Div
Missouri Res Labs
Moore Associates
North Electric Co
Norwood Controls
Optimized Devices
Panellit Inc
Partlow Corp
Peschel Electronics
Photobell Co
Photomation Inc
Post Electronics
Potter Instr Co
Ram Meter Inc
Ramsey Engrg Co
Ransom Research
Reeves Instr Corp
Regent Controls
Reliance Instr Mfg
Research Inc
Revere Corp of Amer
Scientific Instrument
Servo Systems Co
Simmonds Aerocessories
Southwestern Indus Eli.X
Specialties Inc
Spectra Electronics
Sterling Precision
Stromberg Time Corp
Sunshine Scientific
Swartwout Co
Tapco Group
Taylor Instrument
Technitrol Engrg
Telechrome Mfg Corp
Teller Co
Texas Instruments Inc
Thermo Electric
Thermo Electric Mfg
Thomas Engrg Inc
Thompson-Ramo-Wooldridge
Triner Scale & Mfg
Tri-Tronics Co
Trott Electronics
United Aircraft Prods
United Control Corp
United Electric Controls
United Engineers Inc
U S Electrical Motors
Universal Match
Uniwave Inc
Vectrol Engrg
Vickers Electric Prods Div
Victory Engrg Corp
Virginia Electronics
Wang Laboratories
Warrick Co Chas F
Waukesha Motor Co
West Instrument
Westinghouse Director Sys
Westinghouse Electric
Weston Instruments
Westronics Inc
Worner Electronic Devices

CONTROL SYSTEMS, General-purpose, Electromechanical

Abrams Instrument
Advanced Research
Airborne Accessories
American Data Div
Amer Meas & Control
Analogue Controls Inc
Applied Science Corp
Assembly Products Inc
Astra Technical Instr
Automatic Electric
Automatic Timing & Contls
B-I-F Industries
Bailey Co Chas M
Baldwin-Lima-Hamilton
Berkeley Dynamics
Berneo Engrg Corp
Bin-Dicator Co
Brabender Instr C W
Breeze Corporations
Bristol Co
Bulova Research
Burroughs Corp
Bush Associates G F
Cargill Detroit
Cash Co A W
Cash Valve Mfg
Cincinnati Time Recorder
Conoflow
Consol Electrodynamics
Consolidated Systems
Control Technology
Controls Co of Amer
Control Panel Corp
Corbett Science Labs
Cunningham Son & Co
Curtiss-Wright I M I
Dalmotor Div
Datex Corp
Daytronic Corp
Defender Instrument
Designers for Industry
Designs for Tomorrow
Deveo Engrg Inc
Dickson Co
Dynatronics Inc
Eagle Signal
Eastern Industries
Edison Industries T A
Electric Eye Equip
Electric Regulator
Electro Development
Electro Products Labs
Electrosnap
Energy Kontrols
Farmer Electric
Ferguson Hille
Fischer & Porter Co
Fuller Co
Fulton Syphon Div
GPE Controls
General Devices
GE Apparatus Sales Div
General Regulator
Genesys Corp
Gulton Industries
Hagan Chem & Controls
Haydon Co A W
Hays Corporation
Healy-Ruff Co
Houston Instrument
Humphrey Inc
Hydel Inc
Hydromatics Inc
Industrial Engrg Corp
Industrial Nucleonics
Insco Company
Kahn & Co
Kavamil Co
Kearfott Co
Leeds & Northrup
Librascope Inc
Linear Controls
Link Aviation
MacLaren & Co F B
McIlvaine O T
Micro Gee Products
Microloc Corp
Micrometrical Mfg
Milgo Electronic
M-H Aeronautical Div
M-H Brown Instrs Div
Mulrhead Instrs Inc
Murphy Mfg Inc
North Atlantic Indus
North Electric Co
Norwood Controls
Panellit Inc
Parabam Inc
Partlow Corp
Philco Corp
Phoenix Precision Instr
Pneu-Hydro Valve
Precision Mechanisms Corp
Ram Meter Inc
Ramsey Engrg Co
Reeves Instr Corp
Rotary Devices Corp
Sciaky Bros Inc
Specialties Inc
Spectra Electronics
Sunshine Scientific
Tapco Group
Taylor Instrument
Technitrol Engrg
Telechrome Mfg Corp
Tel-Instrument Elx
Texas Instruments Inc
Thermo Electric
Triner Scale & Mfg
United Aircraft Prods
United Electric Controls
Universal Match
Uniwave Inc
Vickers Electric Prods Div
Wang Laboratories
Warner & Swasey Co
Waukesha Motor Co
Weston Instruments
Westronics Inc

COUNTERS, Alarm

Airpax Electronics
Automatic Timing & Contls
Beckman/Berkeley Div
Berkeley Dynamics
Bulova Research
Chrono-Log Corp
Durant Mfg
Fischer & Porter Co
General Controls
Genesys Corp
Nuclear Materials & Eqpt
Philco Corp
Photobell Co
Presin Co
Richardson Scale Co
Tech Measurement Corp

COUNTERS, Electronic, including events-per-unit-time

Airpax Electronics
Allegany Instrument
American Electronics Inc
Analogue Controls Inc
Appalachian Electronic
Baird-Atomic Inc
Beckman/Berkeley Div
Bendix Cincinnati Div
Berkeley Dynamics
Bowmar Instrument
Bulova Research
Burroughs Corp
Canadian Marconi
Computer Equipment
Davenport Mfg
Di/An Controls
Digitran Co
Dymec Inc
Dynapar Corp
Dynatronics Inc
Eberline Instrument
Electronic Computer Co
Electro Precision
Engineered Electronics
Erie Pacific
Erie Resistor
Exline Engrg
Fischer & Porter Co
Freed Transformer
General Controls
General Devices
GE Heavy Mil Elx Dept
General Time Control
Genesys Corp
Hamner Electronics
Haydon Co A W
Hewlett-Packard
Instruments Inc
Landis & Gyr
Lavoie Labs
Link Aviation
Machinery Electrification
Mast Development
Milgo Electronic
Navigation Computer Corp
Northeastern Engrg
Nuclear-Chicago
Nuclear Elx Corp
Performance Measurements
Philco Corp
Photobell Co
Photocon Research
Photomation Inc
Potter Instr Co
Redford Corp
Standard Electric Time
Sciaky Bros Inc
Standard Instrument
Stelma Inc
Sterling Precision
Sunshine Scientific
Systron Corp
Tech Measurement Corp
Telechrome Mfg Corp
Trott Electronics
Universal Match
Uniwave Inc
Veeder-Root Inc
Walkirt Co

COUNTERS, Footage

Abrams Instrument
American Electronics
Automatic Timing & Contls
Beckman/Berkeley Div
Camera Equipt Co
Designers for Industry
Ducommun Co M
Durant Mfg
Dynapar Corp
Electric Tachometer
Freed Transformer
General Controls
Gurley W & L E
Machinery Electrification
Mast Development
M-H Davies Labs Div
Presin Co
Redford Corp
Stevens Mfg George
Veeder-Root Inc

USE **dekatron**®

COUNTING TUBES FOR RELIABLE, HIGH SPEED COUNTING APPLICATIONS

Baird-Atomic uses DEKATRON glow transfer tubes in all instruments where counting and read-out are required. A typical application is the Atomic Instrument Line's Model 134 Scaler for ultra-high speed counting of beta and gamma radioactivity . . . up to 1,000,000 counts/minute! The input circuit incorporates a fast, constant-sensitivity Schmitt discriminator driving a beam switching decade with glow tube read-out . . . 6 DEKATRONS.

You too, can count on DEKATRON for reliable performance. For detailed information request Data Sheet IC 4001.

Baird-Atomic, Inc.
33 UNIVERSITY RD., CAMBRIDGE 38, MASS

Baird Atomic

Instrumentation for Better Analysis

CIRCLE 24 ON READER-SERVICE CARD

COUNTERS, Mechanical, including Stroke
Acromark Co
American Data Div
American Electronics Inc
Borg Equipment Div
Bowmar Instrument
Bulova Research
Digitran Co
Durant Mfg
Electric Tachometer
Empire State Labs
Fischer & Porter Co
General Controls
General Devices
Haydon Instrument
Landis & Gyr
Mast Development
North Electric Co
Presin Co
Richardson Scale Co
Royson Engrg Co
Tejax Engrg Corp
Veeder-Root Inc

COUNTERS, Predetermined, including Batch
Abrams Instrument
American Electronics Inc
Automatic Electric
Automatic Timing & Contls
Beckman/Berkeley Div
Berkeley Dynamics
Beva Laboratory
Bowmar Instrument
Bowser Inc
C & K Components
Di/An Controls
Digitran Co
Durant Mfg
Dymec Inc
Dynapar Corp
Eagle Signal
Electro Precision
Fischer & Porter Co
Foxboro Company
Freed Transformer
Engineered Electronics
Erie Pacific
Erie Resistor
General Controls
Gilmore Industries
Instruments Inc
Landis & Gyr
Machinery Electrification
Mast Development
Photobell Co
Photocon Research
Post Electronics
Potter Instr Co
Presin Co
Ram Meter Inc
Ransom Research
Redford Corp
Richardson Scale Co
Sciaky Bros Inc
Standard Instrument
Stevens Mfg George
Systron Corp
Trott Electronics
Veeder-Root Inc
Walkirt Co

COUNTERS, Revolution
Airpax Electronics
Amerac Inc
American Data Div
American Electronics Inc
Automatic Timing & Contls
Beckman/Berkeley Div
Berkeley Dynamics
Bowmar Instrument
Burroughs Corp
Datex Corp
Digitran Co
Durant Mfg
Eagle Signal
Eastern Specialty Co
Electric Tachometer
Electro Products Labs
Epic Inc
Erie Resistor
Fischer & Porter Co
Foxboro Company
Freed Transformer
General Controls
Gurley W & L E
Haydon Instrument
Hewlett-Packard
Mast Development
North Electric Co
Richardson Scale Co.
Presin Co
Service Recorder
Standard Electric Time
Stevens Mfg George
Streeter Amet
Unlwave Inc
Veeder-Root Inc
Walkirt Co

COUNTERS, Vehicular
American Data Div
American Electronics Inc
Engler Instr
Fischer & Porter Co
Ram Meter Inc
Streeter Amet

CURVE FOLLOWERS (See also X-Y Recorders—Cat. 3)
Curtiss Wright
Electronic Associates
Exactel Instrument
Geotechnical Corp
Gilmore Industries
Houston Instrument
Librascope Inc
M-H Brown Instrs Div
Research Inc
Sanborn Company

DENSITY CONTROLLERS
Air Conditioning Equip
Automation Products
Barton Instrument
Brooks Rotameter
Curtiss Wright
Fischer & Porter Co
Foxboro Company
Hagan Chem & Controls
Hallikainen Instrs
Industrial Nucleonics
Kieley & Mueller
M-H Brown Instrs Div
Nuclear-Chicago
Nuclear Elx Corp
Nuclear Materials & Eqpt
Ohmart Corp
Photobell Co
Poole Instrs Inc
Precision Thermometer
Ramsey Engrg Co
Reliance Instr Mfg
United Engineers Inc
Weston Instruments

DISPLACEMENT INDICATORS, and/or RECORDERS, Angular and Non-linear and Motion
Automatic Timing & Contls
Brush Instruments Div
Daytronic Corp
Dickson Co
Electro Products Labs
General Radio
Gurley W & L E
Houston Instrument
Instrol Inc
Luther Mfg Co
Micro Gee Products
Micrometrical Mfg
M-H Brown Instrs Div
Norwood Controls
Photocon Research
Sanborn Company
Specialties Inc
Sterling Precision
Vinson Mfg Co
Westronics Inc

DISPLACEMENT INDICATORS and/or RECORDERS, Linear Motion
Aeronaut & Instr Div
Automatic Timing & Contls
Brush Instruments Div
Daytronic Corp
Electro Products Labs
Ferranti Electric
Foxboro Company
General Radio
Gurley W & L E
Instrol Inc
Leach Corporation
Luther Mfg Co
Micro Gee Products
Micrometrical Mfg
M-H Brown Instrs Div
Photobell Co
Poole Instrs Inc
Sanborn Company
Schaevitz Engineering
Servonic Instruments
Swartwout Co
Vinson Mfg Co
Westronics Inc

DISPLACEMENT PICK-UPS, Capacitance Type
Berkeley Dynamics
Decker Corp
Micrometrical Mfg
Milton Roy Co
Photobell Co
Photocon Research
Radiaphone Co

DISPLACEMENT PICK-UPS, Differential Transformer Type
Automatic Timing & Contls
Baldwin-Lima-Hamilton
Collins Corp G L
Daytronic Corp
Engis Equipment
Instrol Inc
International Resistance
Micrometrical Mfg
Norwood Controls
Ram Meter Inc
Sanborn Company
Schaevitz Engineering
Swartwout Co
Vinson Mfg Co

DISPLACEMENT PICK-UPS, Magnetic, including Variable Reluctance
Aeronaut & Instr Div
BJ Electronics
Collins Corp G L
Consol Electrodynamics
Dynapar Corp
Edison Industries T A
Electro Products Labs
Engis Equipment
Instrol Inc
Land-Air Inc
M-H Boston Div
Sterling Precision
Sunshine Scientific
Vinson Mfg Co

DISPLACEMENT PICK-UPS, Resistive
Chemiquip
Edison Industries T A
Humphrey Inc
Research Inc
Statham Instruments

DRAFT INSTRUMENTS (See also Boiler Room instruments, also Pressure)
Bacharach Indus Instr
Bailey Meter Co
Barton Instrument
Bristol Co
Defender Instrument
Dwyer Mfg F W
Ellison Draft Gage
General Controls
GPE Controls
Hagan Chem & Controls
Hays Corporation
Moore Products Co
Reliance Instr Mfg
Uehling Instrument
Victory Egrg Corp

DRYERS, Air or Gas
Air-Shields Inc
Cooper Development
Dryomatic Corp
Fisher Co Oscar
Gas Drying Inc
Hankison Corp
Hayes Inc C I
Henry Valve Co
Kahn & Co
Kemp Mfg C M
National Appliance Co
Pittsburgh Lectrodryer
Pritchard Co J F
Robbins Aviation Inc
Selas Corp of America
Sel-Rex Corp
Temperature Engrg Corp
Trinity Equipment
Uehling Instrument
Universal Dynamics
Van Products

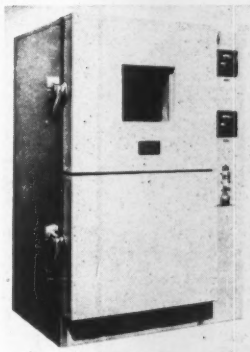
ENGINE GOVERNORS, including Internal Combustion Engines, Steam Turbines, etc.
Bailey Co Chas M
Cash Co A W
Eastern Industries
Electric Regulator
Kahn & Co
Kieley & Mueller
Synchro-Start
Taylor Instrument

ENVIRONMENTAL TEST CHAMBERS and EQUIPMENT, including Humidity, Pressure, Saltspray, Sand, Temperature, Ultraviolet
Aerotest Labs
Air-Shields Inc
Automatic Switch Co
Avco Corp
Bemco Inc
Blue M Electric
Bush Associates G F
Conrad Inc
Custom Scientific Instrs
Development Engrg Co
Electric Hotpack
Fischer & Porter Co
G S Equipment
Grain Lab Equip
Greiner Co Emil
Harris Refrigeration
Haskris Co
Huppert Co K H

CREATING ENVIRONMENT . . .

DEVELCO

COLD CHAMBERS USING LIQUID CO_2



Low Equipment Cost . .

Easy to Use . .

Quick Pulldown to Minus 100°F . .

Small Chambers To Walk-in Rooms . .

To Meet MIL-E-5272C and others

WRITE FOR INFORMATION

DEVELOPMENT ENGINEERING COMPANY, INC.

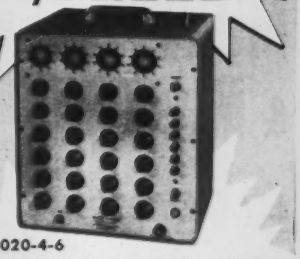
9 Cross Street • Norwalk, Connecticut

• Manufacturers of Environmental Test Equipment

Salt Spray - Fungus - Cold - Heat - Altitude - Humidity

CIRCLE 25 ON READER-SERVICE CARD

NEW!! MULTIPLE PRESET COUNTER by FREED



TYPE 2020-4-6

The Freed Type 2020-4-6 Multiple Preset Counter was designed for sequential predetermining control and is ideally suited for applications when a machine or a process is started manually and stops automatically at several preset counts in one operation. One of the applications for this counter is the winding of tapped toroidal or transformer coils.

Premium components, simplified circuits, using a minimum of computer type vacuum tubes and a silicon diode power supply provides reliable maintenance free operation.

SPECIFICATIONS

- **MAXIMUM COUNT:** 4 digits 9,999
- **COUNTING RATE:** 4000 per second
- **PRESETS:** 1-6
- **INPUT:** Photocell, Switch closure, Pulse
- **OUTPUT:** Relay DPDT — 5 Amp contacts
- **SIZE:** 11 x 13 x 8⅝ inches
- **WEIGHT:** 19½ lbs.
- **POWER SUPPLY:** 105-125 Volts—50-60 cycles

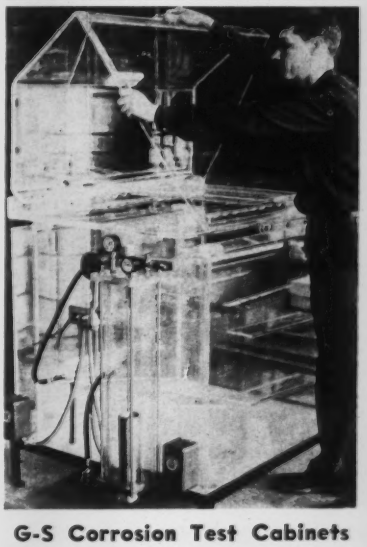
Freed also manufactures Preset, Totalizing, Batching and Timing counters.

Send for complete information.

FREED TRANSFORMER CO., INC.

1735 Weirfield St., Brooklyn (Ridgewood) 27, N.Y.

CIRCLE 26 ON READER-SERVICE CARD



G-S Corrosion Test Cabinets

Highest Uniform Accuracy
Over-All Visibility
At Lower Cost!

★ Salt Fog ★ Humidity Tests
★ Acetic Acid ★ Corrodkote

Meet A.S.T.M. and Gov't Specifications. All-welded H-T Lucite, lined Steel or lined Stainless—sizes, types to suit. Send for new Bulletin, prices.

The G. S. Equipment Co.

15585 Brookpark Rd., Cleveland, Ohio
Phone: CL 2-4770

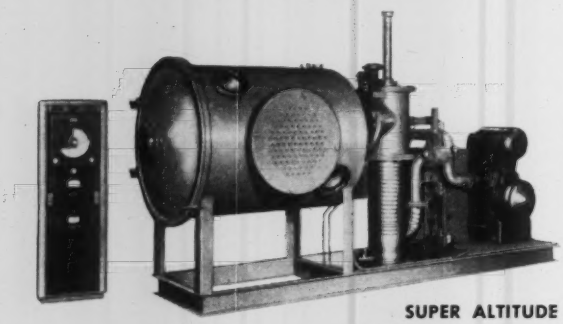
CIRCLE 27 ON READER-SERVICE CARD

everyone talks about

"RELIABILITY"...

MURPHY & MILLER BUILDS IT!

Long before "reliability" became the magic word in describing every conceivable type of equipment, Murphy & Miller was building environmental test equipment that delivered reliability in terms that could be measured: CONTINUOUSLY ACCURATE PERFORMANCE UNDER THE MOST RIGOROUS OPERATING CONDITIONS. (We will always build reliability into everything that bears our name.)

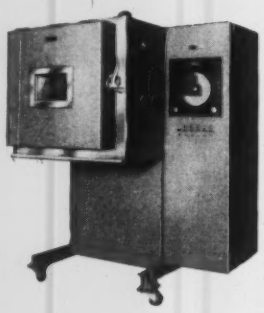


SUPER ALTITUDE SIMULATION CHAMBER

- Sea Level to 350,000 ft. (760 MM Hg to ½ Micron)

COMBINED TEMPERATURE and VIBRATION SIMULATION TEST CHAMBER

- Sizes 1 to 64 cubic feet
- Temperature Range: —120°F. to +500°F
- ALL STAINLESS STEEL TEST SPACE
- Optional Recording, Controlling, and Programming Equipment Available
- Self Elevating Chamber Available (Optional)



COLD TEST CHAMBER

- Temperatures to —200°F
- Stainless Steel Test Space
- Forced Air Circulation
- Heating cycles available to 300°F
- Test space capacities start at 1 cu. ft.

For the best in environmental test equipment, check Murphy & Miller first. Write for illustrated circular.

murphy & miller, inc.

620 West Taylor Street • Chicago 7, Illinois

Engineering Representatives In All Principal Cities

MEMBER OF ENVIRONMENTAL EQUIPMENT INSTITUTE

CIRCLE 28 ON READER-SERVICE CARD

International Radiant
Itemco Inc
Labline Inc
Mast Development
Modern Lab Equipment
Murphy & Miller
NRC Equipment
Nanmac Corp
National Appliance Co
Ozone Res & Eqpt Corp
Research Inc
Standard Cabinet Co
Statham Instruments
Temperature Engrg Corp
Tenney Engineering
United Aircraft Prods
United Electric Controls
Webber Engrg Corp
Will Corporation
Wyle Mfg Corp

FEEDERS, Automatic Proportioning, including Granular Material

Aidlin Automation Inc
American Meter Co
B-I-F Industries
Eriez Mfg Co
Fischer & Porter Co
Fuller Co
Gilmore Industries
Gump Co B F
Hills-McCanna
Infilco Inc
Jeffrey Mfg
Lamp- Insulator
Milton Roy Co
Natl Instrument Co
Ramsey Engrg Co
Richardson Scale Co
Syntron Co
Thayer Scale Corp
Wallace & Tiernan
Weighing & Control Comps

FIRE DETECTORS (see also Combustion Safeguards)

Accuracy Scientific
Barber-Colman
Edison Industries T A
Edwards Co Inc
Falcon Alarm Co
Fenwal Inc
General Controls
Grinnell Co
Phoenix Precision Instr
Redford Corp
Victory Engrg Corp
Worner Electronic Devices

FLOW CONTROLLERS

Amer Meas & Control
American Meter Co
Automatic Switch Co
Automatic Timing & Contls
B-I-F Industries
Bailey Meter Co
Barton Instrument
Beckman/Berkeley Div
Black Sivalls & Bryson
Bowser Inc
Barbender Instr C W
Bristol Co
Brooks Rotameter
Cash Co A W
Cash Valve Mfg
Chemiquip
Controls Co of Amer
Curtiss Wright
Defender Instrument
Denison Engrg Div
Eastern Industries
Fischer & Porter Co
Flow Measurements
Foxboro Company
GPE Controls
General Controls
General Regulator
Hagan Chem & Controls
Hallikainen Instrs
Hays Corporation
Hays Mfg Co
Hydromatics Inc
Infilco Inc
Johnson Service Co
Kates Co W A
Kieley & Mueller
Leonard Inc Wallace D
Magnetrol Inc
Manning Maxwell & Moore
Mason Neilan
McDonnell & Miller
Mercoid Corp
M-H Brown Instrs Div
Moore Products Co
Natl Instrument Labs
North American Mfg
Norwood Controls
Pneu-Hydro Valve
Redford Corp
Reliance Instr Mfg
Rockwell Mfg Co
Selco Instr Div
Simplex Valve & Meter
Swartwout Co
Taylor Instrument
Texas Instruments Inc
United Aircraft Prods
U S Gauge Div
Waugh Engrg Co
Weston Instruments

FLOW INSTRUMENTS, Granular Materials

Bailey Meter Co
B-I-F Industries
Bin-Dicator Co
Curtiss Wright
Flow Measurements
Scrayco Mfg
Wallace & Tiernan
Westronics Inc

FLOW NOZZLES

B-I-F Industries
Bailey Meter Co

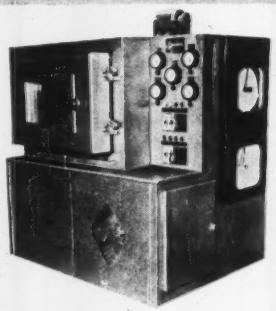
You can DEPEND on --

Standard TEST CABINETS

FOR **ACCURATE** DEPENDABLE ENVIRONMENTAL TESTS

self-contained units to meet every condition

HIGH and LOW TEMPERATURES, ALTITUDE, HUMIDITY, FUNGUS, SAND and DUST, SALT SPRAY, RAIN and SUNSHINE, EXPLOSION and SPECIAL APPLICATIONS.



Every Standard test cabinet is designed for reliable and accurate testing, along with years of care-free durable operation. Whatever the simulated condition is desired to test your product accurately . . . correctly, there is a Standard cabinet to do the job. All guaranteed to give high level performance — the result of a decade of engineering skill and experience in designing and fabricating test equipment. Why not look into the many outstanding features offered by Standard today . . . send for our illustrated Catalog No. 59.

EQUIPMENT AVAILABLE TO MEET ALL GOVERNMENT SPECIFICATIONS

WALK-IN EQUIPMENT DESIGNED AND FABRICATED TO ORDER

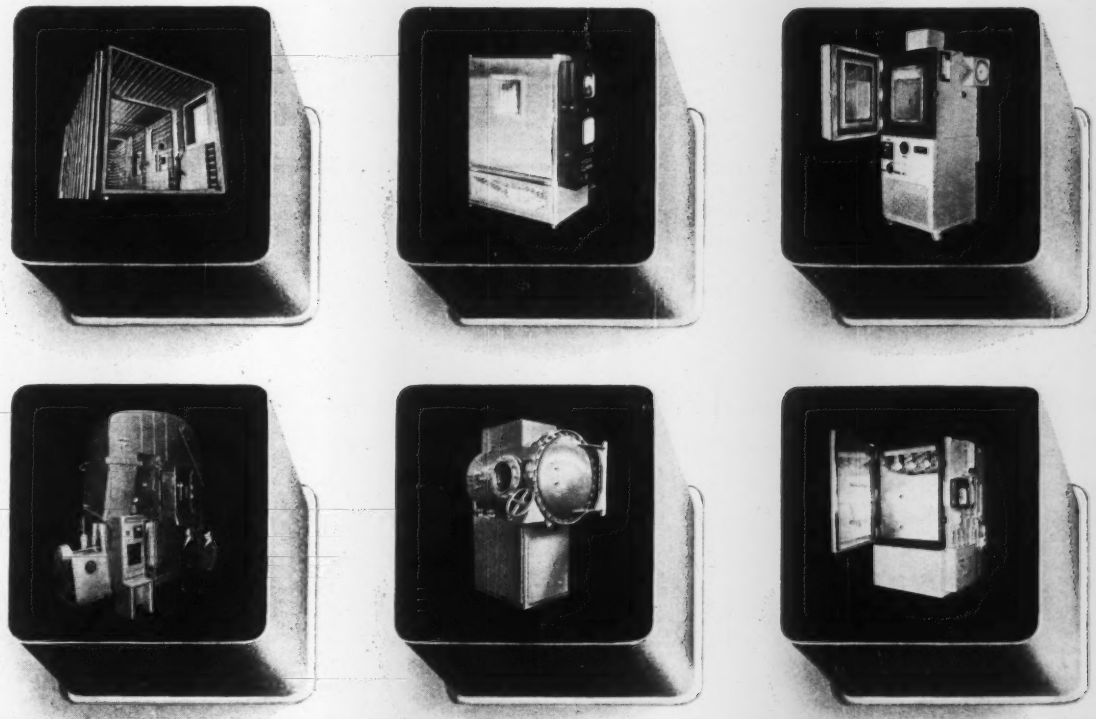
MEMBER OF ENVIRONMENTAL EQUIPMENT INSTITUTE

Standard CABINET COMPANY

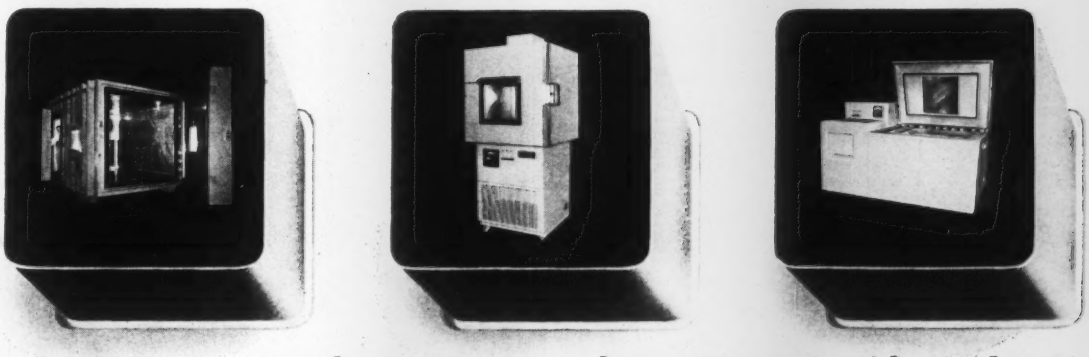
53 WASHINGTON AVENUE
CARLSTADT, NEW JERSEY

DESIGNERS-MANUFACTURERS OF TEST EQUIPMENT

CIRCLE 29 ON READER-SERVICE CARD



Tenney push-button environments



. . . any size, any shape, anytime!

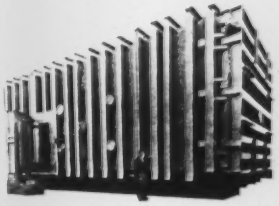
No matter what environmental test chamber you need, this much is certain: Tenney either has it in stock or can adapt one of its proven prototypes. From chambers that could house a family of four, down to refrigerator size (and everything in between), you're sure to find the modern, push-button unit you need.

Altitude, temperature, humidity, explosion, sand, dust, fog—just about every punch nature can throw—can be simulated, either alone or in combination. And you get accurate simulation, complete control and precise measurements every time.

For a complete catalog, describing the entire line, write today to Tenney—the world's largest, most experienced creator of environmental test equipment.

Ask about Tenney's research and development, engineering consultation and design services.

Tenney
ENGINEERING, INC.



1090 SPRINGFIELD ROAD, UNION, N. J. • PLANTS: UNION, N. J. AND BALTIMORE, MD.

OLDEST AND LARGEST MANUFACTURER OF ENVIRONMENTAL EQUIPMENT

CIRCLE 30 ON READER-SERVICE CARD

BAILEY
f/b-LINE
TRANSMITTERS

For Flow, Differential Pressure, and Level Measurements

• Pneumatically transmit rate of flow or differential pressure measurements to indicating, recording, and/or controlling equipment at remote stations. Transmitters consist of a diaphragm measuring mechanism and force-balance pneumatic transmitting unit.

For measurement of steam, water, air, gases, and other fluids with ranges from 0-1 in. H_2O to 2000 in. H_2O at maximum service pressures up to 5000 psig.

Differential range of each diaphragm measuring element may be changed by a factor of 10 to 1 by a simple screwdriver adjustment.

Flow transmitter produces pneumatic signal which is directly proportional to flow, thus eliminating the need for external square-root extractors or characterizers.

Request Product Specification P22-1 for flow, P21-1 for differential pressure and P31-1 for level.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 31 ON READER-SERVICE CARD

BAILEY
AREA METER TRANSMITTERS

Transmits a signal which is directly proportional to rate of flow to indicating, recording, integrating, and/or controlling equipment at remote stations.

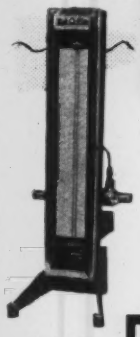
For rate of flow measurement of water, kerosene, gasoline, oil, tar, chemicals, distillates, and refrigerants. Measures rate of flow over a 50 to 1 range. Mounts directly in pipe line.

Signals may be transmitted either electrically or pneumatically.

Request Product Specification E22-4 for electric transmission and Product Specification P22-4 for pneumatic transmission.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 32 ON READER-SERVICE CARD



Model 20

Vol-O-Flo Linear Gas Flowmeter

For Laboratory Plant Special Equipment

ACCURATE • RUGGED • ADAPTABLE

Meters using laminar flow elements have the highest potential accuracy possible. Accuracy is independent of pipe run. Convenient to use. Available for table, pipe, wall, or flush mounting. Specials to order: Pressure to 2000 psig, temperature to 500° F, overflow checks, H-assemblies. Dial indicator type (Model 30) and element only (Model 10, for customer secondary device) are also available.

NATIONAL INSTRUMENT LABORATORIES, Inc.

828 Evarts St., N.E.
Washington, D. C.
NOrth 7-7582

CIRCLE 33 ON READER-SERVICE CARD

Bristol Co
Foxboro Company
General Controls
Hagan Chem & Controls
Haveg Industries
Simplex Valve & Meter
Taylor Instrument

FLOW PICKUPS, Turbine Type (see also Orifice Plates, Venturi Tubes, Pitot Tubes, Flow Nozzles

Aero Research Instr
Barton Instrument
Cox Instruments
Dwyer Mfg F W
Dynamic Instr
Fischer & Porter Co
Gilmore Industries
Natl Instrument Labs
Waugh Engrg Co

FLOW PROVERS

American Meter Co
Brooks Rotameter
Industrial Instr Corp
Porter Inc Geo K
Rockwell Mfg Co
Waugh Engrg Co

FLOW REGULATORS, Self-Operated

Associated Valve Co
B-I-F Industries
Bailey Co Chas M
Bailey Meter Co
Barton Instrument
Black Sivalls & Bryson
Buah Associates G F
Defender Instrument
Denison Engrg Div
Cash Co A W
Cash Valve Mfg
Fischer & Porter Co
General Controls
Grove Valve & Regulator
Hays Mfg Co
Hydromatics Inc
Kates Co W A
Kieley & Mueller
Leonard Inc Wallace O
Moore Products Co
North American Mfg
Pneu-Hydro Valve
Redford Corp
Reliance Instr Mfg
Rebulic Mfg Co
Seico Instr Div
United Aircraft Prods
U S Gauge Div
Victor Equipment
Vinson Mfg Co
Wallace & Tiernan
Weston Hydraulics Ltd

FLOW TOTALIZERS

American Meter Co
B-I-F Industries
Bailey Meter Co
Barton Instrument
Beckman/Berkeley Div
Bristol Co
Brooks Rotameter
Dynapar Corp
Fischer & Porter Co
Flow Measurements
Foxboro Company
GPE Controls
Hagan Chem & Controls
Hallikainen Instrs
Industrial Measurements
Librascope Inc
M-H Brown Instrs Div
Natl Instrument Labs
Simplex Valve & Meter
Swartwout Co
Wallace & Tiernan
Waugh Engrg Co

FLOW TRANSMITTERS

American Meter Co
Automatic Timing & Contls
Bailey Meter Co
Barton Instrument
B-I-F Industries
BJ Electronics
Black Sivalls & Bryson
Bristol Co
Brooks Rotameter
Conoflow
Cox Instruments
Detroit Controls
Exactel Instrument
Fischer & Porter Co
Flow Measurements
Foxboro Company
General Regulator
GPE Controls
Hagan Chem & Controls
Hallikainen Instrs
Hastings-Raydist
Hays Corporation
Industrial Instr Corp
Manning Maxwell & Moore
Mason Neilan
M-H Brown Instrs Div
Moore Products Co
Natl Instrument Labs
Norwood Controls
Pace Engrg Co
Rahm Instruments Div
Revere Corp of Amer
Schutte and Koerting
Simplex Valve & Meter
Swartwout Co
Taylor Instrument
Trans-sonics
United Electric Controls
U S Gauge Div
Waugh Engrg Co

FLOWMETERS, Area, including Cone and Disc Type, Cylinder and Piston Type, Free Float Type

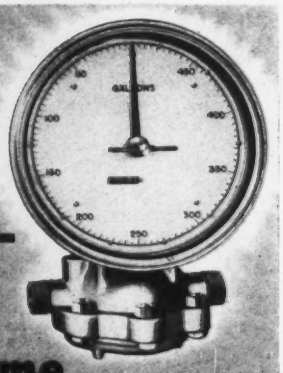
Acme Industrial Co
American Gas Furnace
Amer Meas & Control
Bayley Instrument
Brooks Rotameter
Cox Instruments
Defender Instrument
Dezurik Corp
Dietz Co Henry G
Fischer & Porter Co
Hallikainen Instrs
Hays Corporation
Hoke Inc
M-H Brown Instrs Div
New Jersey Meter Co
Penn Instruments
Phoenix Precision Instr
Porter Inc Geo K
Scanivalve Sales Co
Schutte and Koerting
Seico Instr Div
Simplex Valve & Meter
Victor Equipment
Waukee Engineering

FLOWMETERS, Area, Orifice and Plug Type

Acme Industrial Co
Amer Meas & Control
American Meter Co
Auto-Control Labs
Bailey Meter Co
Bristol Co
Brooks Rotameter
Chemquip
Cox Instruments
Dwyer Mfg F W
Ellison Draft Gage
Fischer & Porter Co
Hays Corporation
King Engrg
Librascope Inc
Meriam Instr Co
M-H Brown Instrs Div
Natl Instrument Labs
Porter Inc Geo K
Robinson Orifice
Schutte and Koerting
Seico Instr Div
Taylor Instrument

FLOWMETERS, Electro-Magnetic, including Turbine

Air Conditioning Equip
Bowser Inc



Measure-Control Liquid Volume with NIAGARA METERS

• Chemicals • Oils & Solvents
• Cold & Hot Water • Syrups, etc.

Single nutating piston volumetric displacement metering, with integrating registers, or explosion proof Electricontact construction. Indicating, recording and controlling attachments also available. Inquire now!

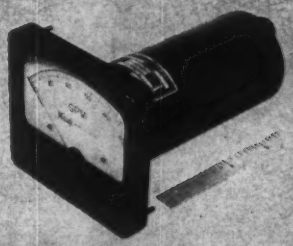
BUFFALO METER CO.
INCORPORATED
2906 Main Street — Buffalo, N. Y.

CIRCLE 34 ON READER-SERVICE CARD

Flow Measurement and Control by Waugh

Six precision measurement devices . . . a sampling of the many developed through Waugh's creative engineering. When planning for the most advanced systems, take advantage of Waugh's ability to meet tomorrow's requirements today.

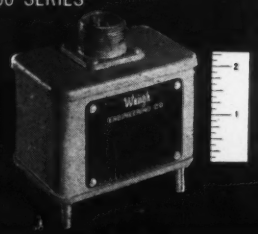
FLOW RATE INDICATOR FR-305



Combines indicating meter with transistorized frequency-to-voltage converter in a single compact package.

- Optional 115v ac or 28v dc power supply.
- Accurate to 1% of full scale.
- Custom scales for all flow ranges and measurement units.
- 250° scale instruments also available.

TRANSISTORIZED FREQUENCY-TO-VOLTAGE CONVERTER FR-300 SERIES



For flow rate or R.P.M. measurements. Combines compact size with high stability and precision.

- 3" x 2" x 2⅛" overall size.
- 0-5 volts output. 0-1 milliampere also available.
- Better than .002% per degree temperature coefficient.

TURBINE FLOW SENSOR FF-FB SERIES

Converts fluid flow into A.C. frequency proportional to flow rate.

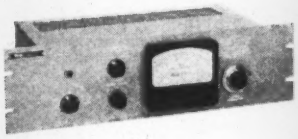
- Exclusive design features low pressure drop . . . high reliability.
- Special series available for gas measurement.
- High frequency models measure flow transients up to 50 cps.

TRANSISTORIZED FREQUENCY DETECTOR FD-100

Provides instantaneous trip signal when input frequency goes above or below preselected limit.

- Used as overspeed trip with tachometer generators or as flow limit switch with turbine flow sensors.
- Trip point accurate within 1%.
- Response time 10 milliseconds maximum.
- 28v output to operate solenoid or relay.

PULSE RATE CONVERTERS SERIES FR-100 AND 200



For converting frequency output of turbine flowmeters or tachometer generators into a DC signal.

- Cabinet or relay rack styles.
- Multiple input channels with built-in indicator.
- 5 to 3000 cps. input frequency range.
- High frequency model gives transient response to 50 cps.

FLIGHT REFUELING FLOWMETER

Used in tanker aircraft to register total fuel transferred.

- Complete system includes sensor and indicator only; no intermediate devices.
- All-transistor circuitry provides high reliability; no mechanical switches.
- Includes circuit to turn on indicator light when fuel is flowing.

Bulletins giving complete physical and technical data on these and other Waugh products will be sent on request. Our engineering staff is available to assist in the development and manufacture of other precision components you may require.

Waugh

ENGINEERING CO.

7842 Burnet Ave. • Van Nuys, Calif.

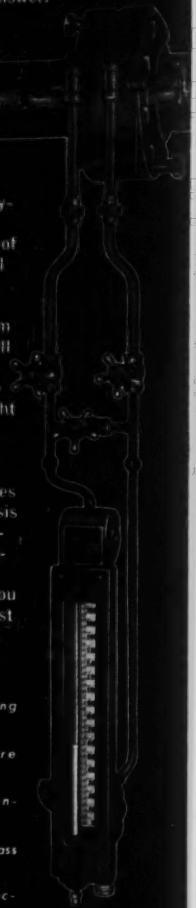
Sales representatives in principal cities

CIRCLE 35 ON READER-SERVICE CARD

UNMATCHED ACCURACY

in direct flow indication

Wherever you seek simplicity and high accuracy in flow measurement at lowest cost, the Meriam "H" Meter is the well-known answer.



Here is an easy-to-install flowmeter . . . free of all conventional service requirements . . . giving long-term economy as well as low initial cost. There are no pressure tight bearings . . . no magnetic followers . . . no stuffing boxes . . . no hysteresis problems whatsoever. No calibration is ever required, yet you have the highest accuracy available.

★ High operating pressures
★ High pressure differentials
★ All steel construction
★ Heavy duty glass enclosure
★ Built-in protection against line surges

Write for Bulletin 18A

Meriam Manometer Instrumentation
...for pressures, vacuums, flows, liquid levels.

meriam
INSTRUMENT COMPANY
10920 Madison Ave. • Cleveland 2, Ohio

CIRCLE 36 ON READER-SERVICE CARD

Cox Instruments
Fischer & Porter Co
Foxboro Company
Flow Measurements
Revere Corp of Amer
Taylor Instrument
Vinson Mfg Co
Waugh Engrg Co

FLOWMETERS, Inferential Type, including Orifice, Nozzle, Pitot, Venturi; for Air, Gas, Liquid or Steam; Indicating and/or Recording

Aero Research Instr
Amer Meas & Control
B-I-F Industries
Bailey Meter Co
Barton Instrument
Bristol Co
Brooks Rotameter
Commercial Iron Works
Defender Instrument
Ellison Draft Gage
Fischer & Porter Co
Foxboro Company
Hagan Chem & Controls
Hastings-Raydist
Hays Corporation
Industrial Instr Corp
Infilco Inc
King Engrg
Meriam Instr Co
M-H Brown Instrs Div
Natl Instrument Labs
Norwood Controls
Penn Instruments
Porter Inc Geo K
Robinson Orifice
Rockwell Mfg Co
Selco Instr Div
Simplex Valve & Meter
Taylor Instrument
United Aircraft Prods
Victor Equipment

FLOWMETERS, Magnetic

Fischer & Porter Co
Foxboro Company
Hays Corporation
M-H Brown Instrs Div
MSA Research Corp
Performance Measurements
Schutte and Koerting
Selco Instr Div

FLOWMETERS, Open Channel, including Flume, V-notch, Weir (see also Waste)

Bailey Meter Co
B-I-F Industries
Bristol Co
Brooks Rotameter
Dezurik Corp
Fischer & Porter Co
Foxboro Company
Hagan Chem & Controls
M-H Brown Instrs Div
Penn Instruments
United Aircraft Prods

FLOWMETERS, Positive Displacement, including Consumer Gas, Nutating Pistons or Disc, Oscillating Piston, Propeller, Reciprocating Piston and Rotary Piston Water Meters, etc.

American Meter Co
Auto-Control Labs
Badger Meter Mfg
B-I-F Industries
Bowser Inc
Buffalo Meter
Fischer & Porter Co
Gurley W & L E
Hays Corporation
Industrial Measurements
InstruLab Inc
Lapp Insulator
Neptune Meter
Porter Inc Geo K
Revere Corp of Amer
Rockwell Mfg Co
Victor Equipment

FLOWMETERS, Sight

Bowser Inc
Cox Instruments
Dietz Co Henry G
Fischer & Porter Co
Greiner Co Emil
New Jersey Meter Co
Petrometer Corp
Schutte and Koerting
Selco Instr Div
Selas Corp of America
Victor Equipment

FLOWMETERS, Vane Type

Air Conditioning Equip
Bailey Meter Co
Bowser Inc
Fischer & Porter Co
Illinois Testing Labs
New Jersey Meter Co
Selco Instr Div
Standard Controls Inc

FURNACE CONTROL SYSTEMS (see Boiler Room Instruments, also Combustion Safeguards)

Astra Technical Instr
Bailey Co Chas M
Bailey Meter Co
Bristol Co
Defender Instrument
Diamond Power Specialty
Eclipse Fuel Engrg
Ellison Draft Gage
Energy Kontrols
Foxboro Company
General Controls
GE Apparatus Sales Div
General Regulator
GPE Controls
Hagan Chem & Controls
Ipsen Industries
Kieley & Mueller
Leeds & Northrup
McIlvaine O T
Moore Products Co
Panellit Inc
Pimex Inc
Reliance Instr Mfg
Thermo Electric
Thermco Instrument
Westinghouse Director Sys
Weston Instruments
Westronics Inc

GAS ANALYZERS, Air

Axler Associates
Bacharach Indus Instr
Crump Instrument
Gelman Instrument
Industrial Instruments
Interelectronics
Mine Safety Appliances
Beckman/Sci & Proc Div
Davis Instruments
Fischer & Porter Co
Fisher Scientific
Fuller Co
Loe Engrg Co
National Spectrographic
Phoenix Precision Instr
Thermco Instrument
Victory Engrg Corp

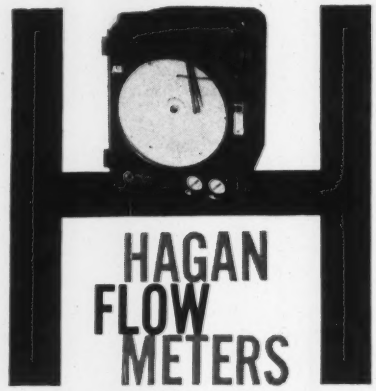
GAS ANALYZERS, Ammonia

Beckman/Sci & Proc Div
Baird-Atomic Inc
Crump Instrument
Davis Instruments
Epic Inc
Fischer & Porter Co
Fisher Scientific
Gow-Mac Instrument
Hallikainen Instrs
Industrial Instruments
Johnson-Williams
Loe Engrg Co
Mine Safety Appliances
Ranarex Div
Thermco Instrument
Universal Match

GAS ANALYZERS, Carbon Dioxide, and/or Carbon Monoxide

American Data Div
American Electronics Inc
Bacharach Indus Instr
Baird-Atomic Inc
Beckman/Sci & Proc Div
Cambridge Instrument
Crump Instrument
Davis Instruments
Defender Instrument
Dwyer Mfg F W
Ellison Draft Gage
Epic Inc
Fischer & Porter Co
Fisher Scientific
Gow-Mac Instrument
Greiner Co Emil
Hays Corporation

When Using This Guide look under the variable, e.g., Pressure Gages (not Gages, Pressure); or look under the noun—Magnets, Permanent (not Permanent Magnets).



HAGAN FLOW METERS

For recording, indicating, integrating or control of flows, Hagan Ring Balance meters offer these unique features:

1. High sensitivity at low flows.
2. Easy calibration under operating static pressures.
3. Sealing fluid density and level not critical.
4. Interchangeable ring assemblies for full scale ranges from 0.5″ w.c. to 560″ w.c. Adjustment on any one ring over a 7:1 differential range.
5. Built-in wide range computation and/or compensation.

HAGAN CHEMICALS & CONTROLS, INC.
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Fiumendosa No. 13, Milano, Italy

CIRCLE 37 ON READER-SERVICE CARD

BAILEY
Fluid Meters
FOR STEAM-LIQUIDS-GASES

• Bailey Fluid Meters are designed to indicate, record, and/or integrate the flow of steam, liquids, or gases under practically any pressure or temperature conditions.

One to four records may be made on a single 12 in. circular chart or two records of flow may be combined in the same case with two integrators or two pneumatic controllers.

Either pneumatic or electric transmission may be used when it is desired to place the Receiver Recorder at a distance from the primary element.

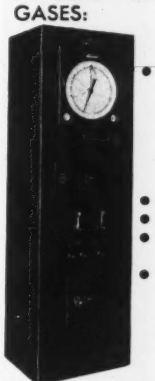
Request Bulletin 20.

BAILEY METER COMPANY
1041 IVANHOE ROAD . CLEVELAND, O.
Bailey Meter Company Ltd. Montreal, Canada

CIRCLE 38 ON READER-SERVICE CARD

PROCESS GAS ANALYZERS

THERMCO SPECIALIZES IN ANALYZERS FOR THE FOLLOWING GASES:



- Oxygen
  Oxygen Purity
  Trace Oxygen Measurements
  Intermediate Oxygen Measurements
- Argon Purity
- Hydrogen Purity
- Hydrogen in Furnace Atmospheres
- Carbon Dioxide

and — Numerous other process control and portable instruments.

We will gladly supply you with complete information on these instruments . . . write:

THERMCO Instrument CORPORATION

Highway U.S. #20

LA PORTE, INDIANA

CIRCLE 39 ON READER-SERVICE CARD

Industrial Instruments
Instr Development Co
Interelectronics
Kruger Instrs Harold
Leeds & Northrup
Loe Engrg Co
Mine Safety Appliances
Thermco Instrument
Uehling Instrument
Universal Match
Victory Engrg Corp

GAS ANALYZERS, Hydrogen, Hydrogen Sulphide, Nitric Oxide, etc.

American Electronics Inc
Bailey Meter Co
Beckman/Sci & Proc Div
Cambridge Instrument
Consol Electrodynamics
Crump Instrument
Davis Instruments
Engelhard Industries
Epic Inc.
Fisher Scientific
Fuller Co
Gelman Instrument
Gow-Mac Instrument
Hastings-Raydist
Hays Corporation
Industrial Instruments
Instr Development Co
Johnson-Williams
Kruger Instrs Harold
Leeds & Northrup
Loe Engrg Co
Mine Safety Appliances
M-H Rubicon Instrs Div
Ranarex Div
Swartwout Co
Thermco Instrument
Universal Match

GAS ANALYZERS, Orsat

Apex Scientific Co
Bacharach Indus Instr
Crump Instrument
Defender Instrument
Ellison Draft Gage
Epic Inc
Fisher Scientific
Greiner Co Emil
Hays Corporation
Mine Safety Appliances
Scientific Glass App

GAS ANALYZERS, Oxygen

Bacharach Indus Instr
Bailey Meter Co
Beckman/Sci & Proc Div
Cambridge Instrument
Consol Electrodynamics
Crump Instrument
Davis Instruments
Defender Instrument
Ellison Draft Gage
Epic Inc
Fisher Scientific
Fuller Co
Gow-Mac Instrument
Greiner Co Emil
Hastings-Raydist
Hays Corporation
Industrial Instruments
Interelectronics
Leeds & Northrup
Loe Engrg Co
Milton Roy Co
Mine Safety Appliances
Thermco Instrument
Universal Match

GAS ANALYZERS, Nitrogen

Beckman/Sci & Proc Div
Cambridge Instrument
Crump Instrument
Davis Instruments
Defender Instrument
Epic Inc
Gow-Mac Instrument
Industrial Instruments
Instr Development Co
Loe Engrg Co
Mine Safety Appliances
Ranarex Div
Thermco Instrument
Universal Match

GAS ANALYZERS, Sulphur Dioxide

Cambridge Instrument
Consol Electrodynamics
Crump Instrument
Davis Instruments
Epic Inc
Fisher Scientific
Hays Corporation
Industrial Instruments
Instr Development Co
Loe Engrg Co
Kruger Instrs Harold
Leeds & Northrup
Mine Safety Appliances
Ranarex Div
Thermco Instrument
Universal Match

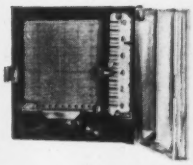
GAS DISTRIBUTION SYSTEM INTRUMENTS, including Gas Station Meters, Pipe Line Instrumentation, Pressure Regulators, Station Instrumentation, etc.

Air Conditioning Equip
American Meter Co

Miniature Graphic Panel instruments for pneumatic transmission

This new system measures, indicates, records and controls pressure (5 in. water to 10,000 psi), absolute pressure (5mm mercury absolute and up), temperature, vacuum, flow, differential pressure, liquid level, and mechanical motion.

The only instrument that fully carries out the basic graphic-panel idea. Includes full plug-in-service and continuous valve position indication. There are 38 receivers and 36 controller models and the widest variety of transmitters on the market. A model is available that will exactly meet every requirement.



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Continuous and Portable units

✓ **CHROMATOGRAPHIC ANALYZERS**

Complete systems for laboratory and process stream analysis — control.
CHROMA-CAT series extends utility of analysis, allows use of AIR as carrier gas.

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Continuous measuring for PART PER MILLION toxic gases in work areas; impurity control in process streams. Applicable on any gases (or gas combustion products) which ionize in water.

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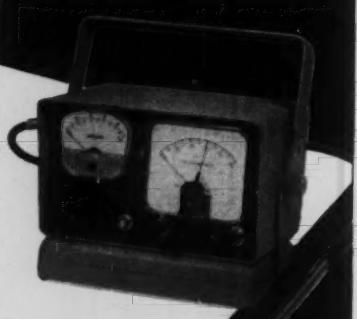

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hand carried instrument for quick, accurate detection of hydrocarbon gases.

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Universal Match

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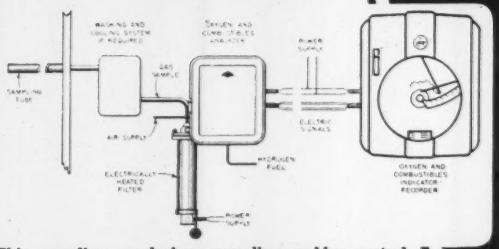
GAS ANALYZERS

BAILEY METERS

for Oxygen & Combustibles Content of Gases



This sampling, analyzing, recording and/or controlling system provides continuous and independent analysis of oxygen and/or combustibles. Analyzer uses hydrogen and/or air for catalytic combustion of sample. Minimum range: 0-5%; maximum range: 0-25%.

Ideal combustion guide and safety device for furnaces, kilns, and heaters. Analyzes and controls output from atmosphere generators.

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E65-3 for Comb. Analyzer
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Simple, sturdy instruments for measuring vacuum or pressure to 250 psi. Cleanout construction; steel, brass, or stainless steel; 6" thru 50" lengths.

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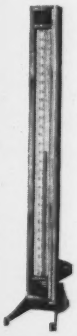
U-tube type, but using two straight glass tubes with cleanout head at each end. Tested for 250 psi. Steel, brass, or stainless steel; 6" thru 130" lengths.



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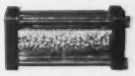

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Used in small-diameter air or gas lines to indicate presence of moisture by change in color of desiccant. Tested for 100 psi.

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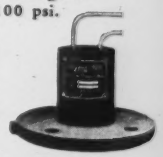
Used with pneumatically-operated instruments where a positive seal is required between instrument system and fluid measured.



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Energy Kontrols
Kahn & Co
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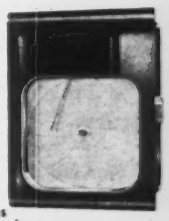

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Meriam Instr Co
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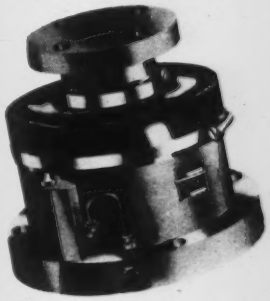

Wherever extreme accuracy and long, maintenance-free service life are factors in weighing and force measurement systems, industry calls on Emery Hydraulic Load Cells. These versatile weighing units can be teamed with practically any type of instrumentation to provide accurate weight or force indication, recording, printing or various control functions.

Emery Hydraulic Load Cells are being used by aircraft companies to measure jet engine and propeller thrust; in the automotive field for dynamometer applications; in the metal-working industry to measure forces in the dies of wire drawing or metal forming equipment; and in the processing industries to weigh tanks and portable cars used in blending operations.

THE EMERY PRODUCT LINE INCLUDES:

- **Bourdon Gauges**
- **Dynamometer Scales**
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- **Hydraulic Scales**
- **Pneumatic Load Cells (Tension and Compression)**
- **Special Weighing Apparatus**

If you have a problem in weighing or force measurement, tell us about it in detail, we will gladly make a recommendation without obligation.

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no meniscus errors

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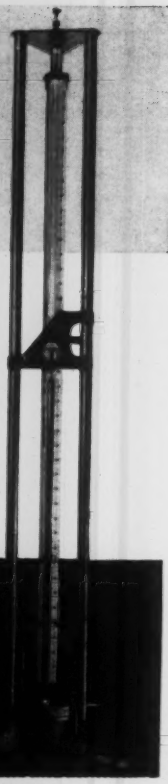

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Seico Instr Div
Simplex Valve & Meter
Specialties Inc
Uehling Instrument
United Engineers Inc
Wallace & Tiernan
Welch Scientific

MANOMETERS, High Pressure

Defender Instrument
Dynametrics Corp
Ellison Draft Gage
Exactel Instrument
Jerber Engineering
Meriam Instr Co
Natl Instrument Labs
Taylor Instrument
Uehling Instrument

MONITORS, including Annunciators

Anadex Instruments Inc
Crump Instrument
Cunningham Son & Co
Edison Industries T A
Edwards Co Inc
Electric Regulator
Electro Devices (Mo)
Houston Instrument
Electro Instruments
Illinois Testing Labs
Nuclear-Chicago
Scam Instrument Corp
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Tigerman Engrg Co
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MOTOR CONTROLLERS AND REGULATORS

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precision mercurial

BAROMETER—MANOMETERS

Used by the U. S. Air Force and leading manufacturers where precise instrument calibration is necessary.

Servo or Manually Operated Pressure Controller Available

Measures Absolute or Differential Pressures

Primary Standard Barometers Available

Features Available

Ranges: 0-31", 0-62", or 0-105" inches of mercury.

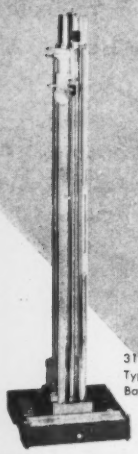
Temperature and Gravity compensated.

True pressure readings with accuracy guaranteed to .02% of full scale.

Visual sighting or Photo Electric Scanner which indicates pressure changes of less than .0004 inch of mercury.

Stop-bar mechanism for production testing at predetermined points.

Choice of scale graduations: inches, millimeters, millbars, or altitude.



31" Type A-1 Barometer

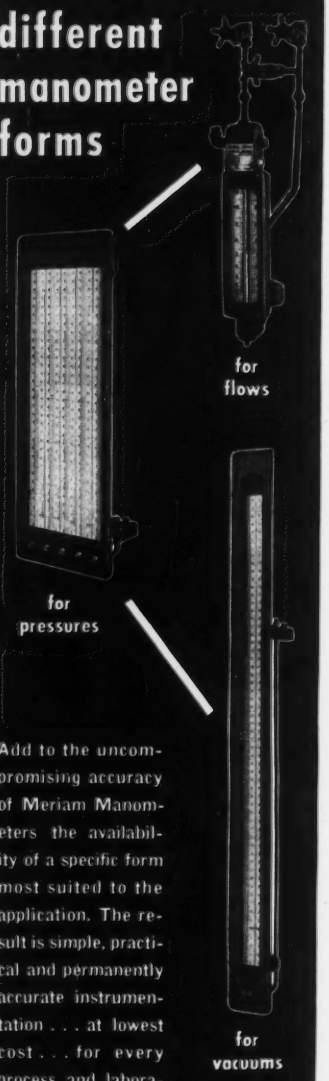
For more information or special problem application call or write:

THE HASS INSTRUMENT CORPORATION
6173 BRANCH AVENUE • Hickory 9-5454 • Washington 23, D. C.

CIRCLE 55 ON READER-SERVICE CARD

UNMATCHED ACCURACY

...in over 1000 different manometer forms



for flows

for pressures

for vacuums

Add to the uncompromising accuracy of Meriam Manometers the availability of a specific form most suited to the application. The result is simple, practical and permanently accurate instrumentation . . . at lowest cost . . . for every process and laboratory need.

Send for Bulletin C-12.

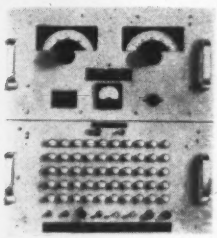
Meriam Manometer Instrumentation
...for pressures, vacuums, flows, liquid levels.

meriam
INSTRUMENT COMPANY
10920 Madison Ave. • Cleveland 2, Ohio

CIRCLE 56 ON READER-SERVICE CARD

TEMPERATURE MONITORING SYSTEM

Signals Dangerous Temperatures From Many Points



T-E's Temperature Monitoring System can be located near to or remote from the process area. When temperature exceeds desired, preset limit, danger is indicated by a red light, which remains red until the adverse temperature is corrected, or by an alarm which remains on until a silencing button is pressed.

• Monitors up to several hundred points in one system • Available with single or multiple set points • Monitors temperatures from −320°F. to +3000°F. • Can also monitor other variables • Functions with thermocouples or resistance bulbs • Signals may be transferred to indicators or recorders • Continuous scanning

Write for bulletin 72-FF

Thermo Electric Co. Inc.
Saddle Brook, New Jersey

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Thermo Electric (Canada) Ltd., Brampton, Ont.

CIRCLE 57 ON READER-SERVICE CARD

When Using This Guide look under the variable, e.g., Pressure Gages (not Gages, Pressure); or look under the noun—Magnets, Permanent (not Permanent Magnets).

Clark Controller
Conoflow
Control Panel Corp
Cutler-Hammer
Dalmotor Div
Datex Corp
Electric Regulator
Furnas Electric
General Controls
GE Apparatus Sales Div
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Gulton Industries
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Northeastern Engrg
OPW-Jordan
Regent Controls
Sciaky Bros Inc
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United Electric Controls
Vee-Arc
Vickers Electric Prods Div
Westinghouse Director Sys

ORIFICE FITTINGS, Flanges, Plates, Seal Chambers, and Unions

Auto-Control Labs
Bailey Meter Co
Bishop & Co J
Bristol Co
Commercial Iron Works
Conoflow
Daniel Orifice Fitting
Ellison Draft Gage
Foxboro Company
Granville-Phillips
Grinnell Co
Haveg Industries
Industrial Instr Corp
Meriam Instr Co
North American Mfg
Robinson Orifice
United Aircraft Prods
Taylor Instrument

ORIFICES, Adjustable

Bailey Meter Co
Bristol Co
GPE Controls
Hydromatics Inc
Natl Instrument Labs

PERISCOPES, Industrial and Smoke

Alfa-American Corp
Buhl Optical Co
Fecker Inc
Gaertner Scientific
Gordon Enterprises
Kollmorgen Optical
Lenox Instrument Co
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Unertl Optical Co
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Commercial Orifice Fittings

TYPE CN—Chambered
2"-20"... 125-2500 lb. ASA

TYPE CS—Chambered
24" and larger...
125-600 lb. ASA

TYPE DSB—Deadline
2"-24"... 125-600 lb. ASA

TYPE DPL—Deadline
2"-24"... 600-2500 lb. ASA

TYPE D-600—Deadline
2"-6"... up to 600 lb. ASA

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For detailed information and distributors, see Composite or Refinery Catalog, or write:

Commercial Iron Works
2424 Porter St.
Los Angeles 21, California
FOUNDERS. MACHINISTS. MANUFACTURERS

CIRCLE 59 ON READER-SERVICE CARD

Buy ONE Manometer

Use it for ALL FLUIDS!

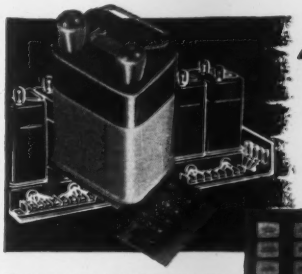
- Dynametrics U-Tube and Single Tube precision-built Manometers feature universal compatability with every manometer fluid. No need to change wetted parts when fluids are changed.
- Wetted parts of Pyrex, stainless steel, and non-deteriorating seals will not corrode in presence of water, mercury, TBE, hydrocarbons.
- 8 U-Tube models, scale heights ±3" to ±25"
- 13 Single Tube models, scale heights 6" to 100"

Large multitube and photopanel units also available for maximum utility in minimum space.

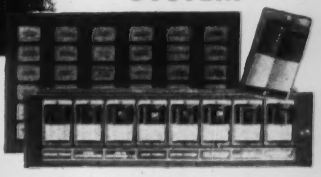
Write for Dynametrics "Pressure Measuring Instruments" Catalog.

DYNAMETRICS CORPORATION
Northwest Industrial Park, Dept. 15, Burlington, Mass.

CIRCLE 58 ON READER-SERVICE CARD



New TEL-ALARM "Unitized" ANNUNCIATOR SYSTEM



- WIDE VARIETY OF CIRCUIT ARRANGEMENTS TO MEET ANY NEED
- HERMETICALLY SEALED UNITS—CORROSION PROOF
- BACKLIGHTED NAMEPLATES OR TURRET LENSES
- STANDARDIZED FOR EASY USE—LOWER COST

HERE is the first "unitized" annunciator. Tel-Alarm incorporates a basic relay unit with many different circuit arrangements available. Tele-Alarm is completely standardized for low cost and easy maintenance.

Tel-Alarm is corrosion proof, hermetically sealed and meets any Class I, Division 2 application. The units are completely self-contained—no complicated wiring—and merely plug into a standard Tel-Alarm chassis. Simple and easy to install.

You can get backlighted nameplates or the new Tel-Alarm *giant* turret lenses for greater visibility. Check into Tel-Alarm today.

Send for your free copy of Bulletin 440
Contains complete circuit sequence diagrams, full range of models for every need.

Tigerman Engineering COMPANY
4332 North Western Ave., Chicago, Ill.
"Protecting America's Industry"

CIRCLE 60 ON READER-SERVICE CARD

For pH control applications, the Hagan system consists of a standard glass electrode and preamplifier, plus a Hagan Model H-O PowrLog receiver for recording and control.

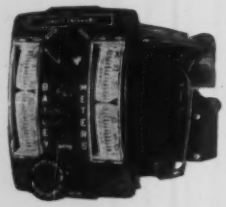
Operating with a high degree of accuracy, the Hagan system provides measurement over a pH span of 2 to 12. The system is simple, easy to install and easy to maintain.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 61 ON READER-SERVICE CARD



BAILEY
MINI-LINE
SELECTOR STATION

• Provides all necessary indications and controls for "bumpless" transfer and for complete automatic or hand operation of a pneumatic control system. Used as a combustion trend indicator, hand-auto selector, and set point or biasing adjuster.

May include as many as four indications of vital control system signals. Vibration and shock proof construction makes the Bailey MINI-LINE Selector Station suitable for marine, mobile, and other severe operating service.

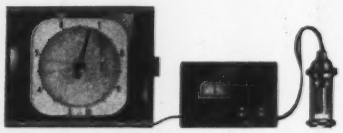
Request Product Specification P99-1.

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 62 ON READER-SERVICE CARD

pH Automatic Controllers and Recorders

Bristol makes a very wide variety of pH Automatic Controllers and Recorders in round- and strip-chart models. The application of pH instruments in industry was pioneered by Bristol nearly 20 years ago. Thousands of Bristol pH Controllers and recorders are in use today in almost every industry. They are known for their high accuracy and rugged construction. Complete information on models offered and method of application is given in 36-page bulletin Q1304. Write for copy.



BRISTOL
COMPANY 112 Bristol Rd., Waterbury 20, Conn.

CIRCLE 63 ON READER-SERVICE CARD

PH CONTROLLERS, INDICATORS and/or RECORDERS
Analytical Measurements
Appalachian Electronic
Assembly Products Inc
Bailey Meter Co
Barber-Colman
Beckman/Sci & Proc Div
Bristol Co
Cambridge Instrument
Coleman Instruments Inc
Electric Eye Equip
Fisher Scientific
Foxboro Company
GE Apparatus Sales Div
Greiner Co Emil
Hagan Chem & Controls
Hays Corporation
International Instrument
Leeds & Northrup
Milton Roy Co
M-H Brown Instrs Div
Phoenix Precision Instr
Process & Instruments
Sel-Rex Corp
Taylor Instrument
Thermo Electric
United Electric Controls
Wallace & Tiernan
Weston Instruments
Westronics Inc

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Allied Radio
Analogue Controls Inc
Autotron Inc
Berkeley Dynamics
Clark Controller
Davenport Mfg
Durant Mfg
Dynapar Corp
GE Apparatus Sales Div
GPE Controls
Gurley W & L E
Eastern Specialty Co
Electric Eye Equip
Energy Kontrols
Epic Inc
Hoffman Electronics
Machinery Electrification
McIlvaine O T
Phoenix Precision Instr
Photobell Co
Photomation Inc
Post Electronics
Redford Corp
Reliance Instr Mfg
Specialties Inc
Spectra Electronics
Standard Instrument
Swartwout Co
Tri-Tronics Co
Trott Electronics
Uniwave Inc
Westinghouse Director Sys
Weston Instruments
Wilson & Co G C
Worner Electronic Devices

PITOT TUBES
Aero Research Instr
Dwyer Mfg F W
Ellison Draft Gage
Flow Corporation
Foxboro Company
General Regulator
Haledy Electronics
Hill & Co E Vernon
Infrared Industries
Meriam Instr Co
Research Appliance Co
Slocomb Co J T
Sterling Precision
Wallace & Tiernan

PRESSURE CONTROLLERS and TRANSMITTERS, Absolute or Static Pressure
Allen-Bradley
American Meter Co
Automatic Timing & Contls
Bailey Co Chas M
Bailey Meter Co
Baldwin-Lima-Hamilton
Barton Instrument
Bayley Instrument
Bendix Montrose Div
B-I-F Industries
Black Sivalls & Bryson
Bristol Co
Bulova Research
Burton Mfg Co
Cash Co A W
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Conoflow
Datex Corp
Daytronic Corp
Denison Engrg Div
Detroit Controls
Fairchild Controls
Fischer & Porter Co
Fisher Governor
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Fulton Sylphon Div
Furnas Electric
General Controls
GPE Controls
Greiner Co Emil
Hagan Chem & Controls
Hass Instrument
Hays Corporation
Healy-Ruff Co
Industrial Engrg Corp
Industrial Instr Corp
Instrol Inc
InstruLab Inc
International Instrument
Johnson Service Co
Kieley & Mueller
Leslie Co
Manning Maxwell & Moore
Mason Neilan
Mercoid Corp
M-H Brown Instrs Div
Moore Products Co
Norwood Controls
Powers Regulator
Rahm Instruments Div
Redford Corp
Reliance Instr Mfg
Scientific Instrument
Seegers Mfg
Seely Instrument
Servo Systems Co
Servonic Instruments
Simplex Valve & Meter
Specialties Inc
Swartwout Co
Taylor Instrument
Trans-Sonics
Uehling Instrument
Ultradyne Inc
United Electric Controls
Westinghouse Director Sys
Weston Instruments

PRESSURE GAGES with Alarms
Acme Gauge & Instr
American Meter Co
Automatic Timing & Contls
Bailey Meter Co
Bristol Co
Crosby-Ashton
Electro Devices (Mot
Ellison Draft Gage
Fischer & Porter Co
Foxboro Company
General Controls
Hays Corporation
Helicoid Gage Div
Hydel Inc
Manning Maxwell & Moore
Meriam Instr Co
M-H Brown Instrs Div
Murphy Mfg Inc
Newark Controls
Norwood Controls
Panellit Inc
Reliance Instr Mfg
Scientific Instrument
Taylor Instrument
Uehling Instrument
United Electric Controls
U S Gauge Div
Weksler Instruments
Wiancko Engrg Co

PRESSURE GAGES, Absolute Pressure
Automatic Timing & Contls
Bailey Meter Co
Barton Instrument
BJ Electronics
Bristol Co
Consol Electrodynamics
Dynamic Instr
Electric Auto-Lite
Ellison Draft Gage
Fischer & Porter Co
General Controls
Hastings-Raydist
Heise Bourdon Tube
Ideal Precision Meter
Manning Maxwell & Moore
Meriam Instr Co
M-H Brown Instrs Div
Moeller Instr Co
Newark Controls
Norwood Controls
Nurnberg Scientific
Reliance Instr Mfg
Scientific Instrument
Servonic Instruments
Solid State Electronics
Statham Instruments
Taber Instrument
Taylor Instrument
Uehling Instrument
Ultradyne Inc
United Electric Controls
U S Gauge Div
Wallace & Tiernan
Weksler Instruments
Wiancko Engrg Co

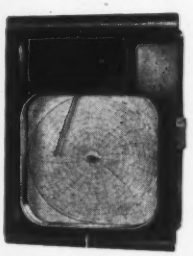
PRESSURE GAGES, Indicating and/or Recorders
Acme Gauge & Instr
American Meter Co
Automatic Timing & Contls
Bailey Meter Co
Baldwin-Lima-Hamilton
Barton Instrument
BJ Electronics
Bristol Co
Consol Electrodynamics
Crosby-Ashton
Daytronic Corp
Defender Instrument
Dickson Co
Dwyer Mfg F W
Electric Auto-Lite
Ellison Draft Gage
Engelhard Industries
Esterline-Angus
Fischer & Porter Co
Foxboro Company
General Controls

Pressure Gauges, Recording and Automatic Control

Bristol Series 500 Gauges come in a very wide variety of models for recording and controlling pressure, draft, vacuum, absolute pressure, liquid level in ranges from 0 to 6 mm of mercury absolute, full vacuum, and from 0 to 3 in. water to 10,000 psi.

These easy-to-use, easy-to-service instruments are highly accurate and extremely stable in all ranges of application.

Write for Bulletins G620 and G621.



BRISTOL COMPANY
112 Bristol Rd., Waterbury 20, Conn.

CIRCLE 64 ON READER-SERVICE CARD

VACUUM and PRESSURE GAUGES

TEST GAUGES—Equal or exceed A.S.A. Grade AA standards. Accuracy within ± ¼% of scale. Sizes from 4½ to 16 inches. **Catalog 400.**

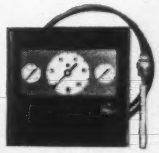
PROCESS GAUGES—The premium SUPERGAUGE line. Accuracy: ± ½% of scale. Available with integral solid front wall for safety. **Catalog 1819.**

"A-LINE" GAUGES—Economical; mid-scale accuracy: ± 1% of scale. Meet all A.S.A. Grade A standards. Cast aluminum case, std. **Catalog 305.**

"O.E.M." GAUGES—Low-cost, drawn case line. Precision-built on volume basis. Midscale accuracy: ±2% of scale. Meet all A.S.A. Grade B standards. **Catalog 64A.**

AUTOMATIC CONTROLLERS

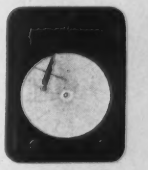
Indicating or Recording



"PILOT" CONTROLLERS—Low-cost pneumatic control. Thermometer or pressure elements. Can be valve mounted. **Catalog 510.**

BY-PASS PANEL mounts below "Pilot" for manual control. **(Bulletin F023).** Another option permits remote pneumatic set point adjustment. **Bulletin F024.**

PILOT-POSITIONER mounts on valve. Combines indicating pneumatic control with quick, accurate valve positioning. Compact and low-cost. **Bulletin F029.**



RECORDING CONTROLLERS with thermometer or pressure elements. Pneumatic or electric contact control. Charts: 6, 9, or 12-in. **Catalog 456A.**

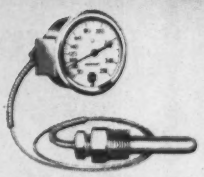
USG INSTRUMENTS AND CONTROLS FOR

Temperatures from −350 to +1000 F • Pressures from 30 in. Hg vac. to 20,000 psi and above

THERM-OMETERS

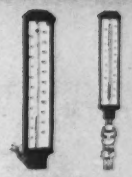
Mercury, Vapor, Gas or Organic Fills

"SUPERTHERM" DIAL TYPE in remote or direct reading (rigid stem or Multi-Angle) styles. Sizes: 3½, 4½, 6 and 8½ in. **Catalog 205.**



DRAWN CASE, DIAL TYPE for O.E.M. applications with lower accuracy requirements. Remote or direct reading styles. Sizes 2 to 8½ in. **Catalog 64A.**

USG RECORDERS—New 12-in. model features modern case with recessed bottom for easier connection. Available for pressure, too. **Bulletin 3025.**



INDUSTRIAL GLASS STEM TYPES with highly visible "Red-reading Mercury." Variety of mountings. Sizes: 5, 7, 9, and 12-in. **Catalog 101.**

PNEUMATIC TRANS-MISSION

PNEUMATIC TRANSMITTERS. Indicate transmitted variable. Match "Pilot" case. Accurate, sensitive, dependable. **Catalog 510.**

PNEUMATIC RECEIVERS. Offered in broad line. Bourdon or diaphragm actuation; 4½ to 16-in.; accuracy: to ¼% of scale; single or duplex. **Catalog 510.**

GAUGE ACCESSORIES

USG accessories include a complete line of chemical attachments and pulsation dampeners. Also, pressure snubbers, gauge fittings, and tools. **Catalog 605.**

Find Your Nearest Distributor In The 'Yellow Pages'

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Division of American Machine & Metals, Inc., 150 Clymer Ave., Sellersville, Pa.

USG®

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built to your specifications . . . 3 week delivery
Seegers
specialists in the manufacturing of gauge components . . .
Military Oxygen Gauges

SEEGERS MANUFACTURING CO.

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Marsh Instr Co
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M-H Brown Instrs Div
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Norwood Controls
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Panellit Inc
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Rockwell Mfg Co
Sanborn Company
Scientific Instrument
Seegers Mfg
Solid State Electronics
Taylor Instrument
Uehling Instrument
Ultradyne Inc
US Gauge Div
Victor Equipment
Weksler Instruments
Weston Instruments

PRESSURE INDICATORS, Electrical Resistance

Baldwin-Lima-Hamilton
BJ Electronics
Gilmore Industries
Gulton Industries
Edison Industries T A
Hagan Chem & Controls
Hydel Inc
InstruLab Inc
Lewis Engrg Co
Manning Maxwell & Moore
Model Engrg
Norwood Controls
Panellit Inc
Rahm Instruments Div
Servonic Instruments
Swartwout Co
Taber Instrument
Thermo Electric
Trans-Sonics
Weston Instruments
Westronics Inc

PRESSURE INDICATORS and/or RECORDERS, High (Above 1000 psi) Pressure

Acme Gauge & Instr
American Meter Co
Automatic Timing & Contls
Bailey Meter Co
Barber-Colman

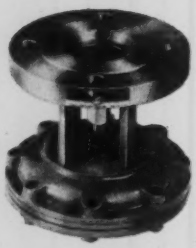
Put the Cartesian Manostat #10 in your system—set it and forget it! Self-contained unit operates automatically, economically, accurately! Interchangeable balanced orifice (choice of 3/16", 3/8", or .070") preserves sensitivity at high capacity, permits direct or reverse action in same instrument.

Cartesian Manostat #10 complete and ready for use, with mercury. $450.00

WRITE FOR COMPLETE DESCRIPTIVE BULLETIN

HOKE. MANOSTAT CORP.
26 N. Moore Street • Dept 17
New York 13, N.Y.
*Patent Applied For

CIRCLE 68 ON READER-SERVICE CARD



CONOFLOW
PRESSURE and LIQUID LEVEL TRANSMITTER

The Conoflow Model "P" Transmitter is a rugged instrument capable of measuring pressure or liquid level, and transmitting a *linear* 3-15 psi signal to a suitable recorder. No dip tubes, floats, or other mechanical devices are required inside the tank. Can be used for many services, on either open or closed vessels. Ideal for viscous fluids or materials which solidify in the static lines of pressure elements of conventional transmitters.

Available for measuring ranges from as low as 0 to 100" of water or pressures as high as 250 psi. Utilizes a corrosion-resistant Inconel X diaphragm suitable for temperatures to 450° F. Measured material cannot penetrate air lines. Safety shut-off feature available. Ranges easily changed in the field.

Conoflow Controls FOREMOST

Write for Bulletin P-2520-3, today. CC714

CONOFLOW CORPORATION
SUBSIDIARY OF WALWORTH COMPANY
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THE CALIBRATING STANDARD
...For Absolute Pressure Work

Ranges: 0-31.5 inches thru 0-100 inches of Hg. absolute in five ranges—45 inch scale in two revolutions.

Accuracy: 1/1000 of full scale

Sensitivity: 1/10,000 in *all* ranges

Write for Publication No. A-114.48-A

WALLACE & TIERNAN
INCORPORATED
25 MAIN ST., BELLEVILLE 9, N. J.
A 114 In Canada: Wallace & Tiernan, Ltd., Toronto

CIRCLE 69 ON READER-SERVICE CARD

PRECISE
ABSOLUTE PRESSURE

TYPE FA-160

From 200 Microns Up

...Ranges: 0—50 mm thru 800 mm Hg absolute in six ranges.
...Accuracy: 1 part in 300 over full scale.
...Sensitivity: 1 part in 500 in *all* ranges.
...Available with 2¾" or 6" dia. dial.

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INCORPORATED
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MARSHALLTOWN

THE RIGHT GAUGE FOR YOUR SPECIFIC NEEDS

Available in a wide variety of general purpose and special purpose gauges in pressure ranges to meet your specifications in every particular.

- PRESSURE
- VACUUM
- COMPOUND
- ALTITUDE
- COMBINATION
- DIAPHRAGM
- HYDRAULIC
- AND SPECIAL PURPOSE GAUGES
- DIAL THERMOMETERS (Vapor Tension or Bi-Metal)

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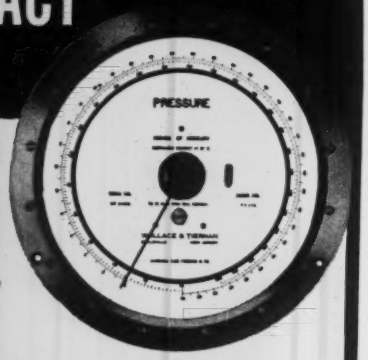

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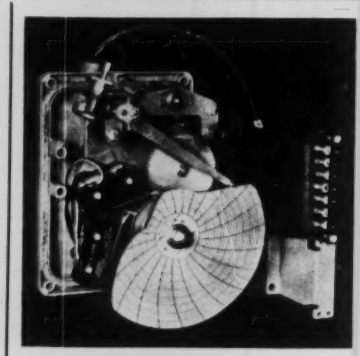

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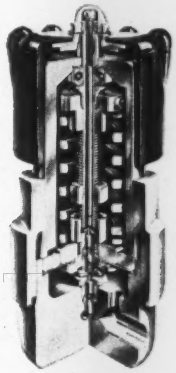

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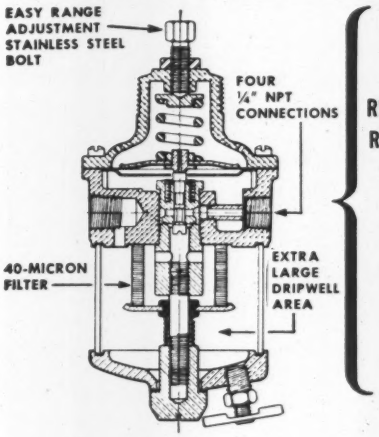

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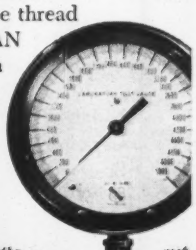

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GG-1

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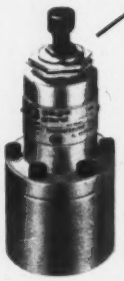

GG-2

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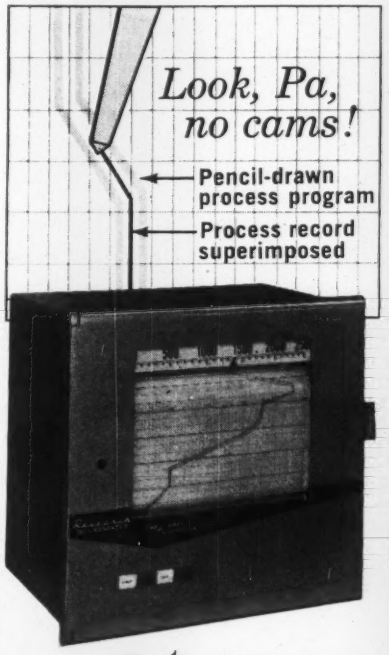

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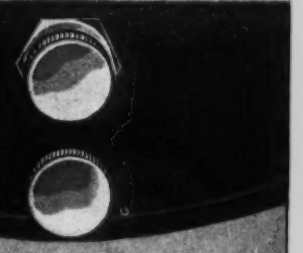

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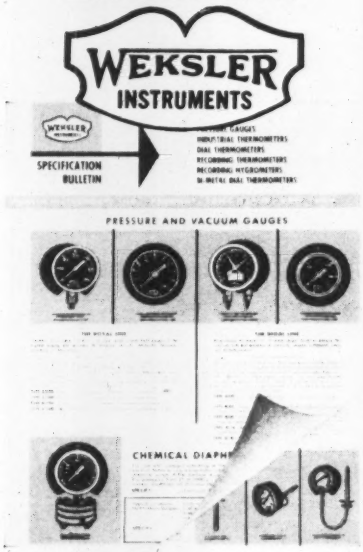

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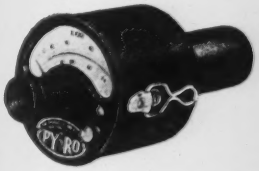

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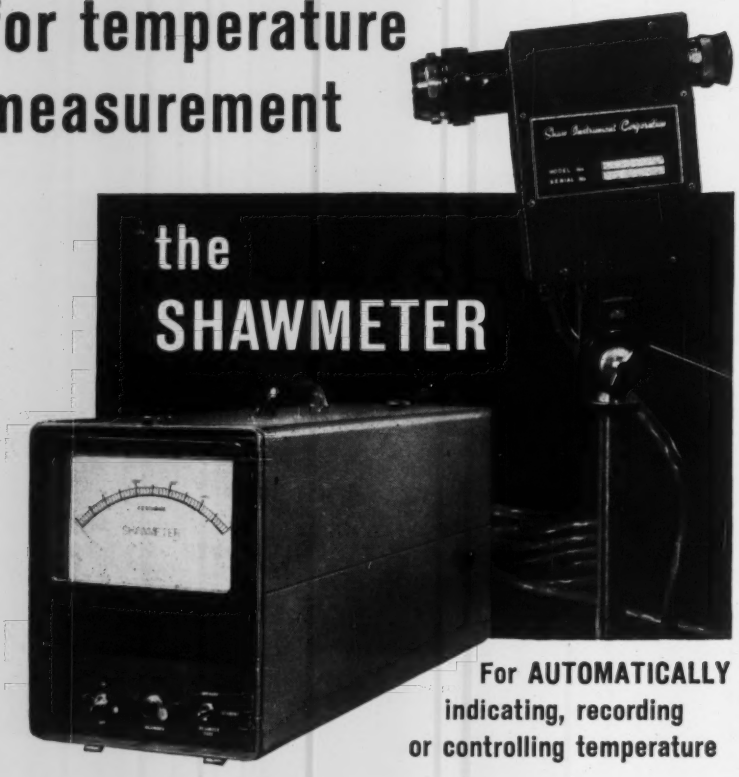
CIRCLE 90 ON READER-SERVICE CARD

A new type instrument for temperature measurement



For AUTOMATICALLY indicating, recording or controlling temperature

NOT a radiation pyrometer
NOT an optical pyrometer

Employing a unique principle that eliminates the shortcomings of previous instruments, the Shawmeter provides an easy, continuous, automatic method of measuring the temperature of flowing molten metal, moving objects in a kiln or furnace, lamp filaments, induction heating coils or other high temperature objects.

The Shawmeter consists of two units: the Sensing Head which responds to the color of the object being measured; and the Control Unit, which converts the information into a direct-reading linear temperature measurement. The Sensing Head may be as close to the object as a few inches, or it may be several hundred feet away. The Control Unit may be placed wherever convenient. Portable style is shown above.

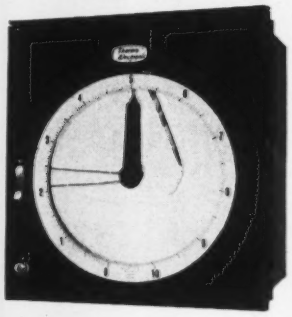
Write for complete details and prices.

SHAW INSTRUMENT CORP.
P. O. Box E-46 Latrobe, Pennsylvania

CIRCLE 91 ON READER-SERVICE CARD

PYROMETERS

T-E has combined advanced design with quality performance in a wide variety of pyrometric instruments.



Recording Controller

Indicators
Self-balancing, potentiometer, bridge, millivoltmeter.

Controllers
Indicating, signalling recording.

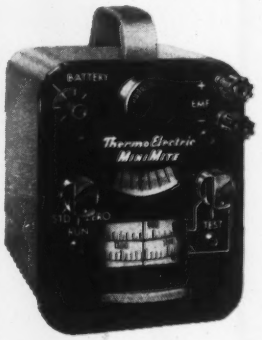
Recorders
Circular chart indicating and controlling.

Other T-E Instruments
"AutoRef"—providing multiple circuit cold-junction compensation
Temperature Monitoring Systems

Write for Instrument Bulletin FF-1

MINIMITE

PORTABLE INDICATOR
Null Balance, Potentiometer Type



This compact unit weighs under 4 lbs.—yet it has a 23½ inch double range scale. It can measure temperatures directly, when connected to a thermocouple, or calibrate other potentiometer or millivoltmeter-type instruments. Available scales cover temperatures from —300°F. to +3200°F. for all standard T/C materials; millivolt ranges from 0 to 62. Accurate to ¼ of 1% of scale range.

Write for Bulletin 64-FF

Thermo Electric Co. Inc.
Saddle Brook, New Jersey
In Canada—Thermo Electric (Canada) Ltd., Brampton, Ont.

CIRCLE 92 ON READER-SERVICE CARD

Illinois Testing Labs
Leeds & Northrup
Lewis Engrg Co
Manning Maxwell & Moore
McHugh & Son Raymond F
M-H Brown Instrs Div
M-H Rubicon Instrs Div
Norwood Controls
Nurnberg Scientific
Ruge Associates
Taylor Instrument
Temperature Engrg Corp
Thermo Electric
Welch Scientific
West Instrument
Weston Instruments

PYROMETERS, Expansion

Burling Instrument
Bristol Co
Nurnberg Scientific

PYROMETERS, Millivoltmetric

Assembly Products Inc
Barber-Colman
Bristol Co
Curtiss Wright
Federal Pacific
GE Apparatus Sales Div
Hays Corporation
Huppert Co K H
Illinois Testing Labs
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
McHugh & Son Raymond F
Meters Inc
M-H Brown Instrs Div
M-H Rubicon Instrs Div
Nurnberg Scientific
Pyrometer Instr Co
Royco Instruments Inc
Sensitive Research Instr
Temperature Engrg Corp
Thermo Electric
Thermo Electric Mfg
West Instrument
Weston Instruments
Westronics Inc
Winslow Company Inc

PYROMETERS, Optical

Avco Corp
Epic Inc
Instr Development Labs
Leeds & Northrup
Nurnberg Scientific
Pyrometer Instr Co
Shaw Instrument
Spectra Electronics

PYROMETERS, Potentiometric

Assembly Products Inc
Bailey Meter Co
Barber-Colman
Bristol Co
Foxboro Company
GE Apparatus Sales Div
Gray Instrument
Hays Corporation
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
M-H Brown Instrs Div
M-H Rubicon Instrs Div
Pyrometer Instr Co
Sensitive Research Instr
Spectra Electronics
Taylor Instrument
Technique Associates
Thermo Electric
Thermo Electric Mfg
West Instrument
Weston Instruments
Westronics Inc
Winslow Company Inc

PYROMETERS, Radiation, Indicating, Recording and/or Controlling

Assembly Products Inc
Bailey Meter Co
Barber-Colman
Barnes Engineering
Bristol Co
Curtiss Wright
Epic Inc
GE Apparatus Sales Div
InstruLab Inc
Leeds & Northrup
M-H Brown Instrs Div
Pyrometer Instr Co
Radiation Electronics
Royco Instruments Inc
Spectra Electronics
Technique Associates
Warner & Swasey Co
West Instrument
Westronics Inc

PYROMETERS, Thermoelectric, Indicating, Recording and/or Controlling

Assembly Products Inc
Barber-Colman
Barnes Engineering
Bristol Co
Epic Inc
Federal Pacific
General Controls
GE Apparatus Sales Div
Gordon Co Claud S
Hays Corporation
Huppert Co K H
Illinois Testing Labs
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
Manning Maxwell & Moore
McHugh & Son Raymond F
M-H Boston Div
M-H Rubicon Instrs Div
M-H Brown Instrs Dir
Nurnberg Scientific
Pyro Service Co
Pyrometer Instr Co
Richards Co Arklay S
Royco Instruments Inc
Sensitive Research Instr
Taylor Instrument
Thermo Electric
Thermo Electric Mfg
West Instrument
Weston Instruments
Westronics Inc
Winslow Company Inc

RECEIVING INDICATORS and RECORDERS, Electric Signal

Applied Science Corp
Atkins Technical Inc
Automatic Timing & Contls
Bailey Meter Co
Barber-Colman
B-I-F Industries
Bristol Co

Printed Circuitry

by Allan Lytel. A valuable working tool; includes alternative and recommended practice for each step in design and production of printed circuits; a buyer's guide to special components; and "how to" service data. Paperboard, illustrated, 192 pages, 1957. $2.00

Electronic Circuitry for Instruments and Equipment

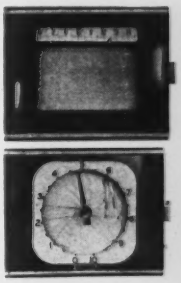
by M. T. Aronson. "Comprehensive source book on instrument circuitry," this complete home-study text includes 458 multiple-choice questions (and answers), 215 illustrations, 10 tables, comprehensive index. Paperbound, 324 pages, 1957 (revised edition). $2.00

100 Electronic Circuits

by M. H. Aronson and C. F. Kezer . . . covers amplifiers, oscillators, pulse circuits, phase shifters, etc. Complete with all circuit component values and response specifications. Paper, 180 pages, 1957. $2.00

INSTRUMENTS PUBLISHING CO.
845 RIDGE AVENUE
PITTSBURGH 12, PENNA.

Potentiometers, Electronic, Round and Strip Chart



Bristol Electronic Dynamaster (R) Potentiometers will measure, record, or automatically control any variable that can be translated into an electrical quantity (d-c current, d-c voltage, capacitance, or resistance).

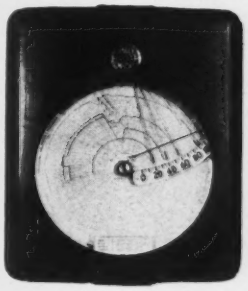
Offered in indicating, recording (up to 24 records on same chart), and controlling. All types of control: air operated, electric, electronic program control.

Write for Bulletin P1245A

BRISTOL COMPANY

112 Bristol Rd., Waterbury 20, Conn.

CIRCLE 93 ON READER-SERVICE CARD



BAILEY

Electronic Pyrometer

• This indicating, recording, and controlling Bailey d-c PYROTRON Receiver Recorder is a self-balancing potentiometer which records one to four continuous temperature records on a 12 in. circular chart. It may be furnished with pneumatic or electric control. A themocouple or a radiation unit is the temperature sensitive element.

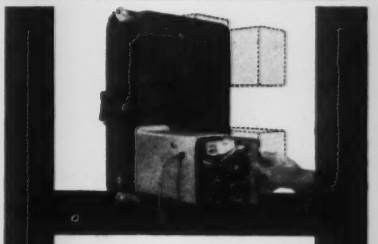
Minimum maintenance is assured by the elimination of galvanometers, millivolt meters, batteries and standard cells. A reversible electric motor, under electronic control, balances the potentiometer circuit and drives the indicating, recording, and controlling features.

Bailey PYROTRON Receiver Recorders are made up of interchangeable "plug-in" assemblies, standardized so that only a few spare parts need be carried in stock for many instruments.

Request Product Specifications E12-5 and E12-4

BAILEY METER COMPANY
1041 IVANHOE ROAD · CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 94 ON READER-SERVICE CARD



HAGAN ELECTRONIC RECEIVERS

For remote recording and/or control of temperatures, or the telemetering of flows, levels and pressures, the Hagan PowrLog instruments offer:

• Thermocouple or Resistance Bulb temperature measurements.
• Unique amplifier used for *all* types of measurements.
• Plug-in input boxes for each application.
• Fast and accurate, up to four variables may be recorded on one chart.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Fiumendosa No. 13, Milano, Italy

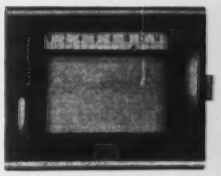
CIRCLE 95 ON READER SERVICE CARD

Pyrometers, Automatic Controllers, Indicators, Recorders

The Bristol line of Pyrometers includes electronic potentiometer, millivoltmeter, thermocouple, and radiation types in indicating, single-pen, two pen, and multiple record (up to 24) models.

Strip-and round-chart recorders and automatic controllers are available with any of the following types of control: electric, electronic, or air-operated with all types of control actions and as program controllers.

Write for Bulletins P1245A, P1242, P1244, P1248, and P1238.



Bristol Dynamaster (R) Electronic Potentiometer

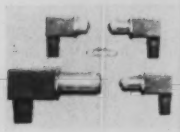
BRISTOL COMPANY

112 Bristol Rd., Waterbury 20, Conn.

CIRCLE 96 ON READER-SERVICE CARD

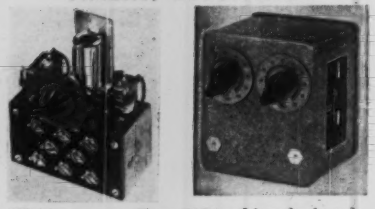
AUTOMATION COMPONENTS

PHOTOELECTRIC SCANNERS, MINIATURE



Small scanning heads for short and medium range (up to 12 feet). High-precision scanning of rapidly moving parts. Write for Bulletin.

TIMERS, ELECTRONIC

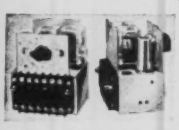


CK Timers use Type 5823 cold-cathode tube that provides instant starting with no tube warmup, immediate recycling, and long tube life. 8-ampere contacts on all models.

Economy Models A, B, C, D, are furnished with choice of six time ranges,—full-scale range of 0.2, 0.5, 1.5, 3, 6, 12, or 24 seconds. Small size—4¾"×3⅞"×2".

Model 3 Repeat-cycle Timer has independent adjustment of ON and OFF cycles, plug-in relays; is totally enclosed. Size 5"×4¼"×3¾".

Model 120 General Purpose Timer features plastic-enclosed plug-in relays, seven basic modes of operation, including repeat-cycle timing. Size 4⅞" × 3¾" × 3½".

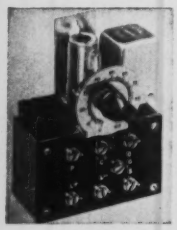


Model 2 Voltage-regulated Timer—Timed interval varies less than 2% of full scale for line voltage change between 95 and 125 volts.

SYNCHRONOUS CONTACTORS

Rotating camshaft actuates distributor-type switches to control punch presses, computors, and machine tools; protects looms, punch and die tools. Single- and double-circuit models available. Bulletin on request.

RELAY, ELECTRONIC



Operated by high-speed low-energy impulses the Type CK electronic relay picks up impulses too small to operate a mechanical relay directly and holds the circuit closed long enough to actuate heavy equipment. Size: 3⅞"×4⅞"×3".

FARMER ELECTRIC

A Switch & Company Incorporated

2200 WASHINGTON ST. NEWTON LOWER FALLS, MASS.

CIRCLE 97 ON READER-SERVICE CARD

Bulova Research
DI/An Controls
Electric Tachometer
Electro Instruments
Engineered Electronics
Epic Inc
Federal Pacific
Fischer & Porter Co
Foxboro Company
GE Apparatus Sales Div
GPE Controls
Gulton Industries
Hagan Chem & Controls
Hays Corporation
Healy-Ruff Co
Houston Instrument
Instrol Inc
Larson Instrument
Leach Corporation
Leeds & Northrup
MacLaren & Co F B
Manning Maxwell & Moore
Massa Div
M-H Brown Instrs Div
North Electric Co
Norwood Controls
Poole Instrs Inc
Precision Mechanisms Corp
Sanborn Company
Scientific Instrument
Swartwout Co
Taylor Instrument
Times Facsimile
Warner & Swasey Co
West Instrument
Weston Instruments
Westronics Inc
Yarnall Waring

RECEIVER INDICATORS, and RECORDERS, Pneumatic Signal

American Meter Co
Applied Science Corp
Bailey Meter Co
B-I-F Industries
Bristol Co
Crosby-Ashton
Dickson Co
Ellison Draft Gage
Fischer & Porter Co
Foxboro Company
GE Apparatus Sales Div
Hagan Chem & Controls
Hays Corporation
Johnson Service Co
Kieley & Mueller
Mason Neilan
M-H Brown Instrs Div
Moore Products Co
Powers Regulator
Scientific Instrument
Taylor Instrument
US Gauge Div
Weston Instruments

REFRIGERATION CONTROLLERS

Atkins Technical Inc
Bristol Co
Controls Co of Amer
General Controls
Haydon Co A W
Partlow Corp
Scientific Instrument
United Electric Controls
Weston Instruments

SCANNERS

Anadex Instruments Inc
Appalachian Electronic
Applied Science Corp
Assembly Products Inc
Baldwin-Lima-Hamilton
Cunningham Son & Co
Datex Corp
Designers for Industry
Electric Eye Equip
Engis Equipment
Erie Pacific
Foxboro Company
GPE Controls
Geotechnical Corp
Gilmore Industries
Gordon Enterprises
Illinois Testing Labs
Lind Corp
Maxson Corp W L
Parabam Inc
Philco Corp
Photobell Co
Powers Regulator
Radiation Electronics
Thermo Electric
Times Facsimile
United Aircraft Prods

SERVO VALVES, Hydraulic

Acme Industrial Co
Amer Meas & Control
Automatic Timing & Con'ls
Cash Valve Mfg
Defender Instrument
Eastern Industries
GPE Controls
General Controls
Hydraulic Controls Co
Hydromatics Inc
Kearfott Co
Leonard Inc Wallace O
Midwestern Instrs
M-H Aeronautical Div
Model Engrg
Moog Servocontrols
North American Mfg
Oilgear Co
Standard Controls Inc
Sterling Precision
Vickers—A & E Center
United Aircraft Prods
Weston Hydraulics Ltd

SIGHT FLOW BUBBLERS

Acme Industrial Co
King Engrg
Petrometer Corp

SMOKE DENSITY INDICATORS and/or RECORDERS

Bacharach Indus Instr
Bailey Meter Co
Bristol Co
Diamond Power Specialty
GE Apparatus Sales Div
Hays Corporation
Hoffman Electronics
Instr Development Labs
Leeds & Northrup
Phoenix Precision Instr
Photobell Co
Photomation Inc
Reliance Instr Mfg
Research Appliance Co
Westronics Inc
Worner Electronic Devices

SPECIFIC GRAVITY CONTROLLERS, INDICATING AND RECORDERS

Accuracy Scientific
Alfa-American Corp
American Meter Co
Automation Products
Barton Instrument
Brooks Rotameter
Dwyer Mfg F W
Federal Pacific
Fischer & Porter Co
Foxboro Company
Hagan Chem & Controls
Hallikainen Instrs
Houston Instrument
Impact-O-Graph Corp
Industrial Nucleonics
Instrumen ts Inc
Kieley & Mueller
King Engrg
M-H Brown Instrs Div
Moore Products Co
Norwood Controls
Ohmart Corp
Petrometer Corp
Poole Instrs Inc
Ranarex Div
Schutte and Koerting
Westronics Inc

SPEED INDICATORS, RECORDERS, and REGULATORS, including Speed Switches

Actuator Prods Corp
Airpax Electronics

BAILEY

RECEIVER RECORDER

● A Recorder and/or Controller for pneumatic and electric transmission systems or for direct operating pressure units. Provides one to four continuous chart records on a single 12 in. circular chart.

"Plug-in", precalibrated units provide flexibility and permit easy field adaptation to revise application requirements. Clean, fresh, brilliant ink is fed to recording pens from sealed sacs which contain a normal one-year's supply.

The "plug-in" components available are:
Pneumatic Receiver
Integrator
A-C Electronic Receivers
D-C Electronic Receivers
Pilotrol
Pneumatic Transmitter
Electric Transmitter
Program Controller
Running Time Recorder
Direct Operating Pressure Recorders

Request Product Specification E12-5.

BAILEY METER COMPANY

1041 IVANHOE ROAD CLEVELAND, O.

Bailey Meter Company Ltd Montreal, Canada

CIRCLE 98 ON READER-SERVICE CARD

SMOKE INDICATORS AND RECORDERS

BAILEY METERS

BAILEY SMOKE DENSITY RECORDER (Bolometer Type)

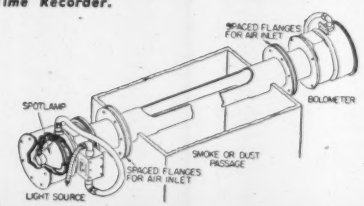
May also be used to indicate Dust Density or Particle Concentration.

The Bailey Smoke Density Recorder quickly reveals inefficient operating conditions and provides 24-hour continuous records. A Bailey Running Time Recorder may be included in the same case to record elapsed time of excessive smoke condition.

Both light source and Bolometer are of sealed beam construction to assure long, accurate life. This unique smoke detector is not affected by high ambient temperatures or corrosive gases. It needs no cooling devices.

Request Product Specification E66-1 for Smoke Density Recorder and Product Specification E12-5 for Running Time Recorder.

Smoke Density Recorder

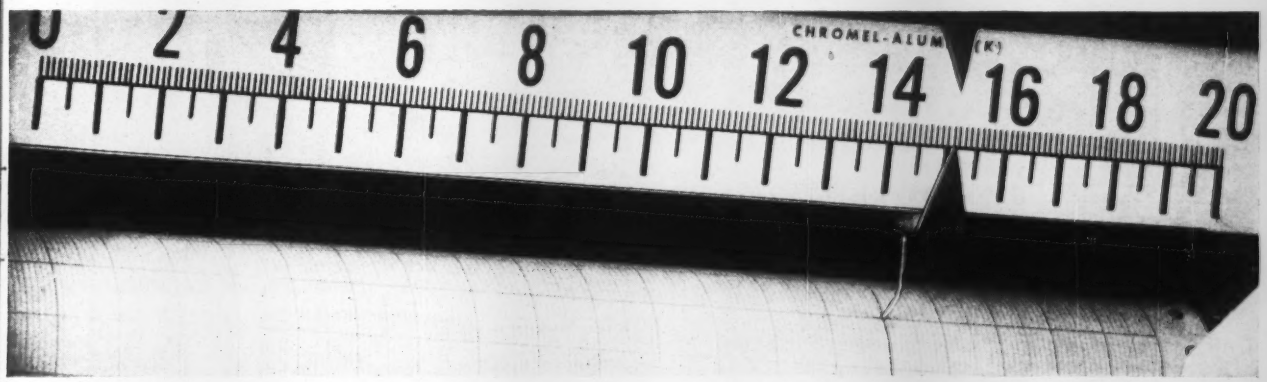


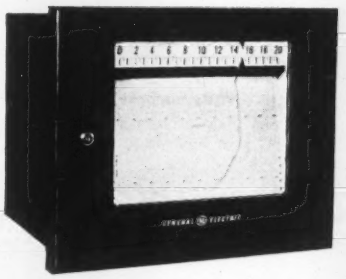
BAILEY METER COMPANY

1041 IVANHOE ROAD · CLEVELAND 10, OHIO

CIRCLE 99 ON READER-SERVICE CARD

standardizes itself continuously . . .





This new General Electric Type HF recorder is continuously self-standardized. And it's typical of the new G-E null-balance strip-chart line. No more batteries, standard cells and standardizing mechanisms . . . new silicon diode voltage source now makes possible completely uninterrupted measurement and control—with measurement accuracy of ± ¼ percent. ***Unitized plug-in construction*** provides simple design with isolation of components by function. All major components are mounted on swing-out mechanism panel for easy servicing outside case. Both single-pen Type HF and two-pen Type HL are available. Or, for an intermittent record of up to 20 different signals, G.E.'s new Type HG multi-point recorder prints as fast as 1.2 seconds per point. All types measure ***wide range of parameters . . .*** pen speeds from 1 to 24 seconds, chart speeds from 1″/hr to 360″/hr, plus many other optional accessories and a variety of control forms. Get the complete story about these and many other outstanding features. Just call your nearby G-E Apparatus Sales Engineer, or write for bulletin GEA-6887, Section 595-102, General Electric Company, Schenectady, N. Y.

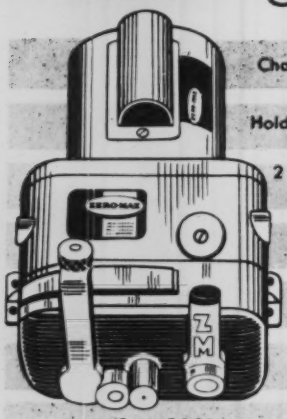
Other Instrument Department Recorders for Electric Utilities— *Inking and inkless; portable and switchboard; duplex and twin; hook-on recording volt-ammeters. Photoelectrics, oscillographs and vibrometers.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

CIRCLE 100 ON READER-SERVICE CARD

ZERO-MAX STEPLESS VARIABLE SPEED



Change speed fast . . . anytime

Holds and re-sets speed accurately

2 to 450 in.—lb. torque ratings (fractional H.P.)

Zero to 2,000 RPM

Full range forward and reverse

Lever, screw or remote controls

LOW COST—ideal for original equipment

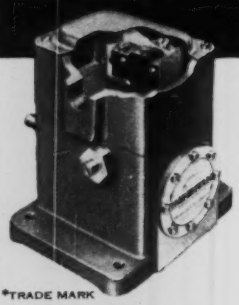
ZERO-MAX stepless variable speed drives are available with or without reverse, gearheads or motors—list price from $37.00 Consult our engineers or write for our free 16-page catalog.

THE ZERO-MAX COMPANY

Subsidiary of Revco Inc.
1938 Lyndale Ave. S., Minneapolis 5, Minn.
Phone: FR 4-5520

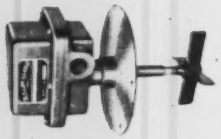
CIRCLE 101 ON READER-SERVICE CARD

New ROTO-GUARD* SHAFT MOTION INDICATOR



Provides positive indication of drop in speed or stopping of machinery. Protects conveyors, elevators, feeders, etc. Rugged, compact; connects to rotating shaft, actuates warning lights or other signals, operates control switches. Simple, positive, low cost. Write for Bulletin RG-16.

*TRADE MARK



ROTO-BIN-DICATOR® motor-driven, paddle-type bin level indicator for use on granular or pulverized material. Ideal for bins under vacuum or pressure. Automatically operates signals and controls.

BIN-DICATOR® diaphragm-type bin level indicator. Successful for 20 years. Automatically operates signals and controls.

BIN-FLO® uses small volume, low pressure air to keep bulk materials moving in chutes, bins, hoppers. No moving parts. Simple installation.

THE BIN-DICATOR CO.
13946-B4 Kercheval • Detroit 15, Mich.

Write for free copy of catalog BD-15 or call
VAlley 2-6932

WE SELL DIRECT • PHONE ORDERS COLLECT

CIRCLE 102 ON READER-SERVICE CARD

Allen-Bradley
American Meter Co
Annin Company
Bailey Meter Co
Barber-Colman
Bin-Dicator Co
Bowmar Instrument
Bristol Co
CGS Laboratories Inc
Control Technology
Detroit Controls
Electric Regulator
Electric Tachometer
Electro Products Labs
Engler Instr
Epic Inc
Esterline-Angus
Federal Pacific
Foxboro Company
GE Apparatus Sales Div
General Radio
Hanson-Gorrill-Brian
Hays Corporation
Hewlett-Packard
Kahn & Co
Leeds & Northrup
Machinery Electrification
MacLaren & Co F B
Marx Co Clarence J
Metron Instrument
Micrometrical Mfg
M-H Brown Instrs Div
North Atlantic Indus
Norwood Controls
Performance Measurements
Photobell Co
Scherr Co George
Servonic Instruments
Snychro-Start
Specialties Inc
Sticht Co Herman
Sterling Precision
Stratos Div
Tapco Group
Taylor Instrument
Thermo Electric
Universal Match
Uniwave Inc
Vectrol Engrg
Vickers Electric Prods Div
Westburg Mfg Co
Westinghouse Electric
Weston Instruments
Westronics Inc
Zernickow Co O

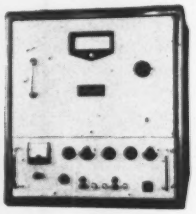
SPEED REDUCERS and SPEED INCREASERS

Actuator Prods Corp
Allis-Chalmers
Annin Company
Bowmar Instrument
Cleveland Worm & Gear
Dalmotor Div
FAE Instrument
Feedback Controls Inc
GE Apparatus Sales Div
Insco Company

STRAIN INDICATORS

DR-20 A basic strain indicator for use with all types of strain gages. Extremely wide calibration range (gage factor ½ to 10) makes the DR-20 ideally suited for use with all types of strain gage transducers.

Write for Bulletin 107



LC-261 A precise automatic null balance strain indicator with extremely wide range.

- Resolution: 0.005%
- Repeatability: 0.01%
- Linearity: 0.02%
- Accuracy: 0.05%

Write for Bulletin 105-A

BYTREX manufactures a complete line of strain gage equipment. Write for further information.

BYTREX

BYTREX CORPORATION
50 HUNT STREET • NEWTON 58, MASS.

CIRCLE 103 ON READER-SERVICE CARD

SPEED SENSITIVE SWITCHES

UNDERSPEED

One S.P.D.T. switch to trip at speeds as low as 400 RPM. Maximum operating speed 5,000 RPM.

OVERSPEED

One S.P.D.T. switch to trip at speeds between 500 and 6,000 RPM.

OVER and UNDERSPEED

Two S.P.D.T. switches to trip at two different speeds between 500 and 6,000 RPM.

OVER—INTERMEDIATE and UNDERSPEED

Three S.P.D.T. switches to trip at three different speeds between 1,200 and 6,000 RPM.

Speeds above or below those listed above must be referred to our Engineering Department for special consideration. Request Bulletin 504 describing our Speed Sensitive Switches.

SYNCHRO-START PRODUCTS
INCORPORATED
8151 N. RIDGEWAY AVENUE, SKOKIE, ILLINOIS
Automatic Engine Control Sets—Safety Alarm Sets—Special Control Panels—D. C. Solenoids—Heavy Duty Relays

CIRCLE 104 ON READER-SERVICE CARD

AMGLO STROBOSCOPIC TUBES

Amglo stroboscopic tubes are standard equipment in a wide variety of stroboscopic instruments, medical electronic units, automotive ignition timers, wheel balancing equipment and high speed photographic units.

A complete range of standard types are available, or special tubes to suit your specific requirements can be developed.

- 400 to 600 Volts
- For Electrolytic or Oil Type Capacitors
- Non-Polarized

Write For New Descriptive Circular!

AMGLO CORPORATION
4333 No. Ravenswood Ave.
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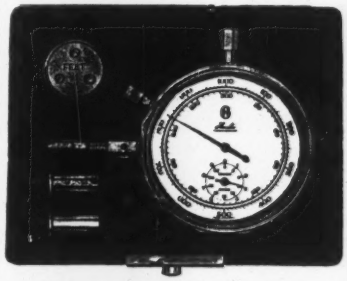
CIRCLE 105 ON READER-SERVICE CARD

SPEED CONTROL with THE HASLER INDICATOR



Chronometric Tachometer with separate reset button for cumulative readings

DURABILITY: over 30 years

ACCURACY: ¼ of 1% of true speed through life

Type A 0-20,000 r.p.m. or 0- 6,000 f.p.m.
Type B 0- 2,000 r.p.m. or 0- 600 f.p.m.

Size 2¾" x ⅞" x 4" Spindle incl.
Weight 7¾ oz. ready for test

Shipment within 5 days from stock

HASLER—TEL CO., INC.
28 Vesey Street, New York 7, N. Y.
U.S. Distributors for Hasler Speed Indicators since 1919

CIRCLE 106 ON READER-SERVICE CARD

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Link Aviation
Lovejoy Flex Coupling
Metron Instrument
Planet Instrument
Precision Mechanisms Corp
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Sterling Precision
Stratos Div
U S Electrical Motors
Uniwave Inc
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SPEED SYNCHRONIZING INDICATORS
Airpax Electronics
Bowmar Instrument
Electric Tachometer
PIC Design Corp
Sterling Precision
US Electrical Motors
Uniwave Inc

STRAIGHTENING VANES
Bailey Meter Co
Bristol Co
Daniel Orifice Fitting
Foxboro Company
Robinson Orifice

STRAIN GAGES, including Bonded and Unbonded Resistance Type
Allegany Instrument
Baldwin-Lima-Hamilton
Bytrex Corp
Daytronic Corp
Dynamic Instr
Foxboro Company
Gulton Industries
High Temperature Instrs
Metzger & Son F F
Statham Instruments

STRAIN-RATE and STRESS-RATE CONTROLLERS
Baldwin-Lima-Hamilton
Bytrex Corp
GE Apparatus Sales Div
Research Inc
Westronics Inc

STRAIN-TIME RECORDERS
Allegany Instrument
Baldwin-Lima-Hamilton
B & F Instruments
Brush Instruments Div
Daytronic Corp
Electro Instruments
Ellis Associates
Geotechnical Corp
Gilmore Industries
Sanborn Company
Westronics Inc

STRESS-STRAIN ANALYZERS, INDICATORS and/or Controllers
Allegany Instrument
Anadex Instruments Inc
Baldwin-Lima-Hamilton
B & F Instruments
Boone Instrument
Brush Instruments Div
Bytrex Corp
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Consolidated Systems
Datran Electronics
Daytronic Corp
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Gilmore Industries
Hewlett-Packard
Performance Measurements
Telechrome Mfg Corp
Westronics Inc

STROBOSCOPES
Berkshire Laboratories
Chadwick-Helmuth
Epic Inc
General Radio
Hickok Electrical Instr
Kemlite Labs
Stieht Co Herman

TACHOGRAPHS
Electric Tachometer
Engler Instr
Sanborn Company
Sangamo Electric Co
Stieht Co Herman
Zernickow Co O

TACHOMETERS, CENTRIFUGAL
Actuator Prods Corp
Amthor Testing
Associated Research
Durant Mfg
Electric Auto-Lite
Jones Motrola
Stieht Co Herman
Zernickow Co O

TACHOMETERS, Chronometric
Amthor Testing
Associated Research
Boulin Instrument
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Hasler Tel
Marx Co Clarence J

STICHT TACHOMETERS

FOR EVERY NEED . . . EVERY SPEED

CENTRIFUGAL HAND TACHOMETERS

Universal Type UO with 5 ranges in one instrument. With overspeed protection.

CAT. NO. 303, 30-12,000 RPM
CAT. NO. 314, 45-18,000 RPM
CAT. NO. 322, 60-24,000 RPM
CAT. NO. 346, 120-48,000 RPM

Many other models with one, three or five ranges. BULLETIN 750

CHRONOMETRIC HAND TACHOMETERS

"Jaquet" Speed Indicators with built-in chronometer movement. Timing period 3 or 6 seconds. Guaranteed accuracy 1/2 of 1 per cent. Various accessories.

CAT. NO. 2301, 0-10,000 RPM
CAT. NO. 2302, 0-1,000 RPM
CAT. NO. 2304, 0-100 RPM

Suitable double rated speed. BULLETIN 735

CENTRIFUGAL STATIONARY TACHOMETERS

For permanent mounting on machines. Model J. Sizes 3 in., 4 in., 5½ in., 8 in. and 10 in. dial diameters. Flexible cable driven. Many standard ranges reading RPM, FPM, YPM, etc. BULLETINS 794, 795, 796

VIBRATING REED TACHOMETERS

PORTABLE AND STATIONARY

Measure speed by touch. Many different ranges from 900-100,000 RPM.

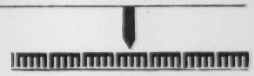
WRITE FOR BULLETIN 770

HERMAN H. STICHT CO., INC.
27 PARK PLACE, NEW YORK 7, N. Y.

CIRCLE 107 ON READER-SERVICE CARD

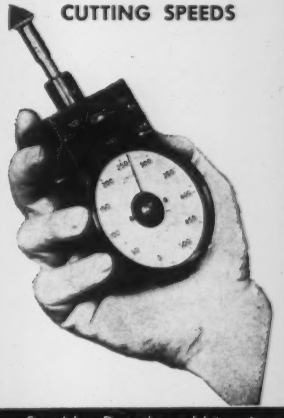
SMITHS TACHOMETERS

For Precise and Rapid Measurements of



SHAFT SPEEDS
SURFACE SPEEDS
CUTTING SPEEDS

- **Magnetic Design** Steady readings accurate to ±0.5% at any part of any scale.
- **Instantaneous Reading** No timing or waiting.
- **Self-Powered** Needs no battery. Always ready for immediate use at full accuracy.
- **Nine Ranges** To 50,000 rpm on highest. Interpolate tenths of rpm on lowest.
- **Overspeed Protection** Inherent and built-in.
- **Hold Button** "memorizes" reading when desired.



Complete Service Facilities *Send for Details and Literature*

CLARENCE J. MARX CO.
Box 4033, Cleveland 23, Ohio

CIRCLE 108 ON READER-SERVICE CARD

BOULIN TACHOMETERS

Boulin has the answer to most Tachometer problems in their large selection of varied units.

For specific information write to our Technical Service Division.

VISUTAC

Completely Portable, entirely self-powered Stroboscope. 2 Models. Wt. less than 12 oz.

MAGNETIC (hand)

4 models. Registers variable as well as constant speeds.

CENTRIFUGAL

Hand & Stationary models. 3 Ranges. Stop & Reset features.

CHRONOMETRIC

Quick foolproof Reading. Ranges up to 20,000 R. P. M.

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10 FIRST STREET • NORTH PELHAM, N. Y.

CIRCLE 109 ON READER-SERVICE CARD

Martindale Electric
Standard Electric Time
Sticht Co Herman
Zernickow Co O

TACHOMETERS, Electric and Electromagnetic

Airpax Electronics
Assembly Products Inc
Avionic Supply
Beckman/Berkeley Div
Biddle Co James G
Bristol Co
Dalmotor Div
D & R Ltd
Designers for Industry
Diehl Mfg Co
Dymec Inc
Dynapar Corp
Electric Auto-Lite
Electric Tachometer
Electro-Mechano Co
Epic Inc
Foxboro Company
GE Apparatus Sales Div
Gurley W & L E
Hansen Co Wm
Haydon Co A W
Hewlett-Packard
Ideal Industries
Kahn & Co
Kearfo t Co
Machinery Electrification
Marx Co Clarence J
Metron Instrument
M-H Brown Instrs Div
Muirhead Instrs Inc
Norwood Controls
Pace Engrg Co
Performance Measurements
Raydyne Corp
Servo Systems Co
Sticht Co Herman
Southwestern Indus Elx
Tapco Group
Uniwave Inc
Varo Mfg Co
WacLine Inc
Waugh Engrg Co
Westberg Mfg Co
Westinghouse Electric
Weston Instrumen s

TACHOMETERS, Miscellaneous, including Cross Pendulum, Fly-ball, Ignition actuated, Tilting-ring (see also Frequency—Cat. 3)

Actuator Prods Corp
Associated Research
Biddle Co James G
Boulin Instrument
Electric Auto-Lite
Electro-Mechano Co
Fox Valley Instr
Marx Co Clarence J
Ram Meter Inc
Sticht Co Herman
Westberg Mfg Co
Zernickow Co O

TACHOMETERS, Recording

Amthor Testing
Bailey Meter Co
Barber-Colman
Biddle Co James G
Bristol Co
Durant Mfg
Electric Tachometer
Esterline-Angus
Foxboro Company
GE Apparatus Sales Div
Kahn & Co
Leeds & Northrup
Metron Instrument
M-H Brown Instrs Div
Norwood Controls
Sanborn Company
Sticht Co Herman
Thermo Electric
WacLine Inc
Waugh Engrg Co
Westberg Mfg Co
Westinghouse Electric
Weston Instruments
Westronics Inc
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TACHOMETERS, Speed Limit Control

Airpax Electronics
Assembly Products Inc
Beckman/Berkeley Div
Bristol Co
Dalmotor Div
Designers for Industry
Dynapar Corp
Electro Products Labs
FAE Instrument
Gilmore Industries
Jones Motrola
Kahn & Co
Leeds & Northrup
Machinery Electrification
Marx Co Clarence J
Metron Instrument
Murphy Mfg Inc
Norwood Controls
Sanborn Company
Scherr Co George
Standard Electric Time
Sticht Co Herman
Tapco Group
WacLine Inc
Waugh Engrg Co
Westberg Mfg Co
Weston Instruments
Zernickow Co O

TACHOMETERS, Stroboscopic

Boulin Instrument
General Radio
Sticht Co Herman
Westberg Mfg Co

TACHOMETERS Vibrating Reed

Biddle Co James G
Epic Inc
Sticht Co Herman
Verdell Instrument

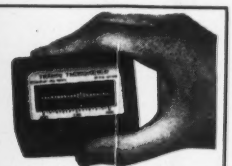
TACHOSCOPES

Biddle Co James G
Sticht Co Herman
Zernickow Co O

TELEMETERING SYSTEMS, Electrical, including Remote-Control Equipment

Aircraft Armaments
American Data Div
American Electronics Inc
American Meter Co
Applied Science Corp
Arnoux Corp
Automatic Electric
Bailey Meter Co
B-I-F Industries
Bristol Co
Brooks Rotameter
Bulova Research
Consol Electrodynamics
Consolidated Systems
Control Panel Corp
Cooper Development
Cunningham Son & Co
Curtiss Wright IMI
Designers for Industry
Detroit Controls
Diamond Power Specialty
Dl/An Controls
Digitran Co
Dynatronic Inc
Electro-Mechanical Res
Epsco Inc
Femco Inc
Fischer & Porter Co
Foxboro Company
GPE Controls
General Devices
GE Apparatus Sales Div
Genesys Corp
Geotechnical Corp
Gulton Industries
Haydon Co A W
Hoover Electronics
Land-Air Inc
Leach Corporation
Leeds & Northrup

If You Measure
SPEED
Your Best Bet is
BIDDLE



FRAHM® RESONANT REED TACHOMETERS

JAGABI® TACHOMETERS

JAGABI® TACHOSCOPES

JAGABI® SPEED INDICATORS

JONES TACHOMETERS

METRON TACHOMETERS

DR. HORN TACHOMETERS

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B-614

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CIRCLE 110 ON READER-SERVICE CARD

O-Z TACHOMETERS

Precision Centrifugal and Chronometric Types

MODELS WITH ONE, TWO, THREE OR FIVE RANGES FOR ALL SPEEDS 0-100,000 RPM
PORTABLE AND STATIONARY

Send for Circulars

EXPERT REPAIR SERVICE—ALL MAKES
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TACHOMETERS — TACHOSCOPES

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CIRCLE 111 ON READER-SERVICE CARD

HAGAN TEMPERATURE MONITOR

Scans and monitors equipment temperatures from thermocouple inputs, and will also accommodate inputs from flow, pressure etc. Rack mounted, the Hagan Kybernetes Indicator Monitor has these features:

- Continuous alarm scanning at the rate of 5 points per second.
- Individual setting of high and/or low alarm points.
- Alarm scanning not interrupted during readout on the T.I.
- Unaffected by variations in thermocouple lead lengths.
- Operational check for all circuits.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 112 ON READER-SERVICE CARD

Lel Inc
Magnasync Mfg Co
Manning Maxwell & Moore
Micro Gee Products
Midwestern Instrs
M-H Brown Instrs Div
Moore Associates
North Electric Co
Norwood Controls
Philco Corp
Radiaphone Co
Radio Frequency Labs
Reliance Instr Mfg
Rotary Devices Corp
Sangamo Electric Co
Sierra Electronic Corp
Simplex Valve & Meter
Telechrome Mfg Corp
Union Switch & Signal
United Electrodynamics
United Engineers Inc
Warner & Swasey Co
Westinghouse Electric

TELEMETERING SYSTEMS, Pneumatic

American Meter Co
Bailey Meter Co
B-I-F Industries
Bristol Co
Brooks Rotameter
General Devices
Mason Neilan
M-H Brown Instrs Div
Moore Products Co
Powers Regulator
Radiaphone Co
Sangamo Electric Co
United Electrodyamics

TELEMETERING SYSTEMS, RF including Microwave, Radio Remote Control

Aircraft Armaments
Applied Science Corp
Automatic Electric
B-I-F Industries
Bulova Research
Bristol Co
Consolidated Systems
Cooper Development
Cunningham Son & Co
Dalmotor Div
Designers for Industry
Diamond Power Specialty
DuMont Labs Allen B
Dynatronics Inc
Electro-Mechanical Res
Epsco Inc
General Devices
General Mills Inc
Geotechnical Corp
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Intercontinental Elx
Land-Air Inc
Lel Inc
Midwestern Instrs
Moore Associates
P and H Electronics
Parsons Co Ralph M
Philco Corp
Radiaphone Co
Radio Frequency Labs
Servo Systems Co
Sierra Electronic Corp
Solid State Electronics
Stavid Engineering
Tapco Group
Telechrome Mfg Corp
United Electrodynamics
Westinghouse Electric
Wiancko Engrg Co

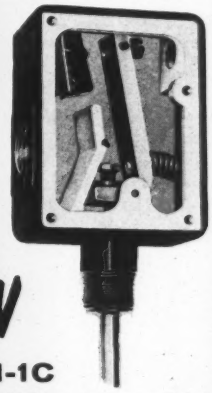
TELEVISION, Industrial

Dage Television
Designers For Industry
Diamond Power Specialty
DuMont Labs Allen B
Entron Inc
GE Apparatus Sales Div
General Precision Lab
Philco Corp
Telechrome Mfg Corp
Tel-Instrument Elx
Zoomar Inc

TEMPERATURE ALARM SYSTEMS

Aero Research Instr
American Meter Co
Amoux Corp
Assembly Products Inc
Atkins Technical Inc
Barber-Colman
Bristol Co
Burling Instrument
Edison Industries T A
Electro Devices (Mo.)
Energy Kontrols
Falcon Alarm Co
Fenwal Inc
Fischer & Porter Co
Foxboro Company
Fulton Sylphon Div
General Controls
GE Apparatus Sales Div
Gilmore Industries
Hagan Chem & Controls
Hawk Tool & Engrg
Illinois Testing Labs
Kahn & Co
Leeds & Northrup
Mack Electric Devices
McIlvaine O T
M-HBrown Instrs Div
Murphy Mfg Inc
Norwood Controls
Panellit Inc
Philadelphia Scien Glass
Precision Thermometer
Pyrometer Instr Co
Scientific Instrument
Spectra Electronics
Stevens Mfg Co
Taylor Instrument
Temperature Engrg Corp

Burling Temperature Controls



New

Model M-1C Burling Thermostat

The new M-1C Thermostat has been especially developed to satisfy the need for a compact and reliable on-off control or high temperature alarm. Provides the perfect heat sensitive instrument for all limited space, maintenance-free installations.

- Weathertight Aluminum Case
- Gray Hammertone Finish
- Operates by Differential Expansion of Solids
- Snap-Action Miniature Switch
- Available in range up to 1200°

Other instruments available for electric or pneumatic operation up to 2000° F.

Send for Bulletin 121

BURLING INSTRUMENT CO.

16 River Road • Chatham, N. J.

CIRCLE 113 ON READER-SERVICE CARD

Third Edition

Maintenance and Servicing of Electrical Instruments

By
JAMES SPENCER

In charge of Instrument and Relay Dept., Meter Division, Westinghouse Electric Company

". . . of great value to all those whose problem it is to keep in operation the electrical instruments on vital production equipment."

265 pages, 274 illustrations

$2.00 postpaid

Remittance must accompany order

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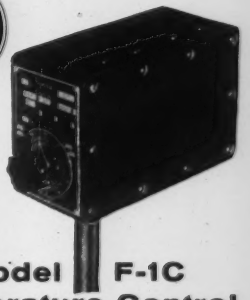
Pittsburgh 12, Pa.

Burling Temperature Controls



Model F-1C Temperature Control

All "F" Series Burling Temperature Controls are designed for any installation requiring a locally-mounted, non-indicating type control. Combine a differential expansion type sensing element and sturdy cast aluminum housing to provide an extremely reliable and durable heat-sensitive instrument for all temperatures up to 2000°F. Model F-2C & F-3C have multiple switches and may be used for:

- Combination Control and Alarm
- Alarm and Shut-Down
- Split Load Control
- Any Action at Two or Three Temperatures

Other instruments available for electric or pneumatic operation up to 2000° F.

Send for Bulletin 107-1

BURLING INSTRUMENT CO.

16 River Road • Chatham, N. J.

CIRCLE 114 ON READER-SERVICE CARD

HAGAN CPM-1 TEMPERATURE CONTROLLER

For the control of temperatures where high precision is a must, the CPM-1 Controller uses Hagan PowrAmp for initial amplification, with magnetic amplifiers for summing and integration. A saturable reactor forms the final control element, and proportional band, reset and rate action are available.

For all types of electric heating applications, the Hagan CPM-1 Controller offers precision digital set point and stepless fractional degree regulation. The CPM-1 will handle up to 330 kva.

HAGAN CHEMICALS & CONTROLS, INC.

DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
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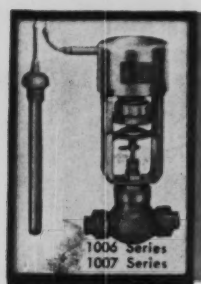
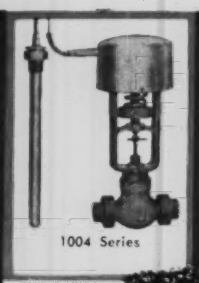
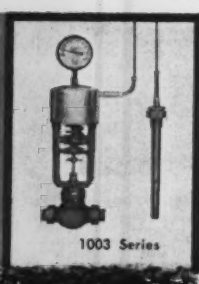
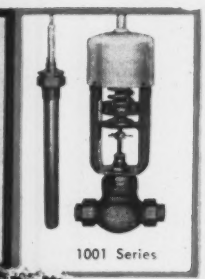
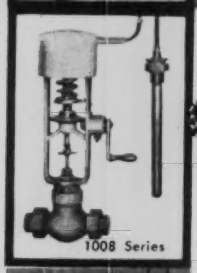
CIRCLE 115 ON READER-SERVICE CARD

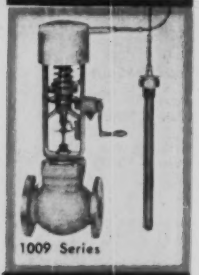


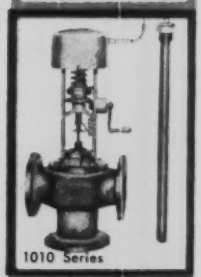


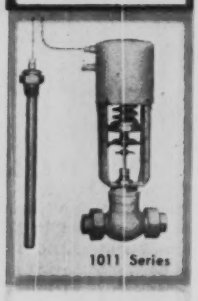












Why NINE?

A good question: *why* do we have nine different temperature regulators, when *one* should do the job?

Because one *can't* do the job: there are too many jobs, with too many different needs.

Even with nine it could be a problem—except for our flexibility of design that provides for almost limitless variations on the basic models.

Whatever your temperature problem, we think you'll find the answer here. Let's check 'em out! . . .

1001 Series: Wide temperature ranges from −30°F. to 480°F. Valve sizes ¼" to 2" single seated; ¾" through 4" double seated; ¼" through 2" three-way. Smallest practical bulb size; wider proportional band for stability.

1003 Series: 55°-60°F. adjustable ranges from −25° to 455°F. Valve sizes ¼" through 2" single; ¾" through 4" double; ¼" through 3" three-way. Small bulb size; intermediate proportional band. Indicating thermometer optional. Commonly used sizes and ranges available from stock.

1004 Series: For larger valves or higher pressure drops. Narrow proportional band. 40°F. adjustable ranges, −35 to 425°F. Valve sizes ¼"-2" single; ¾"-6" double; ¼"-6" three-way. Thermometer optional.

1006 Series-1007 Series: Fail-safe; damage to thermal system automatically opens or closes valve as required. 30°F. adjustable ranges, −50 to 325°F. Valve sizes (1006): ¼"-¾" single; ¾"-2" double — (1007): ¼"-2" single; ¾"-4" double; ¾"-3" three-way.

1008 Series: Crank provides quick adjustment of control point. Same characteristics and valve sizes as 1003. Thermometer optional.

1009 Series: Crank for manual positioning of valve during start-up or abnormal conditions. Same characteristics and sizes as 1003. Thermometer optional.

1010 Series: Our biggest regulator . . . designed exclusively for 3" through 6" three-way valves. Manual valve positioner.

1011 Series: Unique all stainless steel regulator for corrosive locations. Same characteristics and sizes as 1003.

No other manufacturer offers such a variety of temperature regulators designed for specific needs. Write today for full specifications.

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ROBERTSHAW-FULTON CONTROLS COMPANY

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Thermo Electric
Universal Match
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Victory Engrg Corp
West Instrument
Westinghouse Director Sys
Weston Instruments
Westronics Inc
Yellow Spring Instr

TEMPERATURE CALIBRATION EQUIPMENT

Aero Research Instr
Bristol Co
Electric Hotpack
Fenwal Inc
Hallikainen Instrs
Kahn & Co
Leeds & Northrup
McHugh & Son Raymond F
M-H Brown Instr Div
Pyrometer Instr Co
Radiation Electronics
Temperature Engrg Corp
Thermo Electric
Trans-Sonics
United Electric Controls
Westronics Inc
Wianeko Engrg Co
Winslow Company Inc
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TEMPERATURE CONTROLLERS AND REGULATORS

Allen-Bradley
Andersen Labs
Annin Company
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Assembly Products Inc
Astra Technical Instr
Atkins Technical Inc
Atlas Valve Co
Bailey Co Chas M
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Cash Co A W
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Detroit Controls
Deutsch Co
Dickson Co
Eclipse Fuel Engrg
Electronic Processes Corp
Epic Inc
Fenwal Inc
Fischer & Porter Co
Foxboro Company
Fulton Sylphon Div
GPE Controls
General Controls
GE Apparatus Sales Div
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H-B Instrument
Hagan Chem & Controls
Hallikainen Instrs
Hill & Co H Vernon
Illinois Testing Labs
InstruLab Inc
Johnson Service Co
Kahn & Co
Keckley Co O C
Kieley & Mueller
Leeds & Northrup
Leslie Co
Loe Engrg Co
Manning Maxwell & Moore
Marsh Instr Co
Martin & Co H S
Mason Neilan
Mercoid Corp
Metals & Controls Div
M-H Boston Div
M-H Brown Instrs Div
Molex Products
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Murphy Mfg Inc
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Partlow Corp
Philadelphia Scien Glass
Powers Regulator
Precision Thermometer
Pyrometer Instr Co
Redford Corp
Research Inc
Scientific Instrument
Seeley Instrument
Stevens Mfg Co
Swartwout Co
Taylor Instrument
Temperature Engrg Corp
Thermo Electric
Thermo Electric Mfg
Thermo Products Co
Tri-R Instruments
United Aircraft Prods
United Control Corp
United Electric Controls
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6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386	
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387	
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10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390	
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391	
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15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	335	355	375	395	
16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396	
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397	
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398	
19	39	59	79	99	119	139	159	179	199	219	239	259	279	299	319	339	359	379	399	
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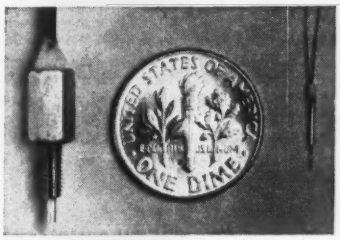

MINIATURE COAXIAL THERMOCOUPLES FOR SURFACE TEMPERATURES TO .015" DIA.-NOBLE & BASE METALS.

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The Motech Co.
Box 6009, Kansas City 10, Mo.
Phone—LO-1-0202

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THERMOCOUPLES, Base Metal (see also Wire, Thermocouple—Cat. 9)

Aero Research Instr
Astra Technical Instr
Barber-Colman
Bristol Co
Consol Controls
Engelhard Industries
Foxboro Company
Gordon Co Claud S
Harco Labs
High Temperature Instrs
Illinois Testing Labs
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
McHugh & Son Raymond F
Metals & Controls Div
M-H Brown Instrs Div
Motech Co
Nanmac Corp
Pacific Transducer Corp
Pyro-Electric Inc
Pyro Service Co
Pyrometer Instr Co
Revere Corp of Amer
Richards Co Arklay S
Royco Instruments Inc
Slocomb Co J T
Smith Mfg Co Inc
Thermo Electric
Thermo Products Co
Trinity Equipment
West Instrument

THERMOCOUPLES, Contact Type (see also Thermometers Surface)

Aero Research Instr
Astra Technical Instr
Barber-Colman
Bristol Co
Conax Corp
Dyna-Empire Inc
Epic Inc
Gordon Co Claud S
Harco Labs
High Temperature Instrs
Illinois Testing Labs
Leeds & Northrup
McHugh & Son Raymond F
Motech Co
Nanmac Corp
Pacific Transducer Corp
Pyro-Electric Inc
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PIONEERS IN ABSOLUTE TEMPERATURE MEASUREMENT AND CONTROL

RdF STIKONS
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- 36 Basic Types of Resistance Thermometer Elements to Measure Temperatures from Absolute Zero to 2,000°F — with Unlimited Applications in Industry, Automation, Missilry, Testing Laboratories.
- Temperature Indicating Instruments.
- Complete Systems for Temperature Measurement and Control.

Measurement is our business. Let us help you.

Arthur C. Ruge Associates, Inc.
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Miniature FAST-RESPONDING Surface THERMOCOUPLE

New Design Features Offer for the First Time a Thermocouple with:

- A Response Time of Less than 10 Microseconds
- A Maximum Continuous Service Temperature of Over 2000°F.
- An Operating Pressure Range to 50,000 psi
- A Sensing Tip with unlimited Life

Revolutionary design uses thin ribbon thermocouple wires and mica insulation of .0002 inches thickness. Will operate under extremely high velocity and high pressure conditions.

Available in all standard thermocouple elements.

For additional details and models write for Bulletin No. TB 159.

NANMAC CORPORATION
P. O. Box 8, Indian Head, Md.

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Thermocouples and Pyrometer Supplies

Get this new, free engineering handbook . . . on selection and application of thermocouples and pyrometer accessories

Complete, easy-to-use, 56-page compilation of Bristol's line of modern thermocouples and pyrometer accessories . . . tables of calibration data . . . PLUS illustrated catalog of the complete Bristol line of thermocouples, extension wire, protection tubes, insulators and accessories.

BRISTOL COMPANY

Write for your free copy of this 56-page Pyrometer Guide.

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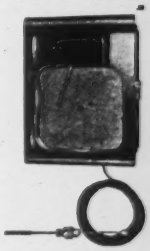
THERMOMETERS, —Recording and Automatic Controlling . . . for temperatures from —125F to +1000F

Bristol Series 500 Thermometers, the product of over 70 years of instrument-making experience, feature the latest developments in instrument engineering.

In manufacturing hundreds of thousands of recording and automatic controlling thermometers, The Bristol Company has developed a variety of models, sizes, and temperature ranges to fill every requirement.

Write for Bulletin T840.



BRISTOL COMPANY

112 Bristol Rd., Waterbury 20, Conn.

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THERMOCOUPLES

MINIATURE

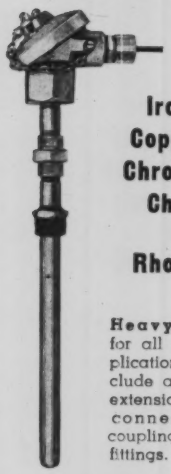
Iron-Constantan
Copper-Constantan
Chromel-Constantan
Chromel-Alumel
Platinum-Rhodium-Platinum

GASKET
BAYONET
RIVET
EXPOSED LOOP
PROTECTED
SHIELDED
STAGNATION

Industrial Miniature thermocouples are made for use in chemical and oil refining processes, power plants, plastic molding, etc.—for any application requiring a small-size yet sensitive assembly.

Aircraft Miniature Thermocouples, harnesses, connectors and extension wires, including "MIL" spec types, for turbo and reciprocating engines. Thermocouples designed for airborne or test stand use.

HEAVY DUTY INDUSTRIAL



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Copper-Constantan
Chromel-Constantan
Chromel-Alumel
Platinum-Rhodium-Platinum

Heavy Duty thermocouples for all industries and all applications. Accessories include a complete selection of extension wires, terminals, connection heads, quick-coupling connectors and fittings.

PROTECTION TUBES
THERMO WELLS

Available in all commercial materials for all industries. Both built-up and bar stock.

Write for Thermocouple Catalog CFF

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Saddle Brook, New Jersey

In Canada—
Thermo Electric (Canada) Ltd., Brampton, Ont.

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Aero Research Instr
Astra Technical Instr
Barber-Colman
Bristol Co
Conax Corp
Epic Inc
Foxboro Company
Gordon Co Claud S
Harco Labs
High Temperature Instrs
Illinois Testing Labs
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
Marshall Co L H
McHugh & Son Raymond F
Metals & Controls Div
M-H Brown Instrs Div
Motech Co
Nanmac Corp
Pacific Transducer Corp
Pyro-Electric Inc
Pyro Service Co
Pyrometer Instr Co
Revere Corp of Amer
Richards Co Arklay S
Slocomb Co J T
Smith Mfg Co Inc
Thermo Electric
Thermo Products Co
Trinity Equipment
West Instrument

THERMOCOUPLES, Rare Metal

Aero Research Instr
Barber-Colman
Bristol Co
Epic Inc
Foxboro Company
Gordon Co Claud S
Harco Labs
High Temperature Instrs
Illinois Testing Labs
InstruLab Inc
Leeds & Northrup
McHugh & Son Raymond F
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Pacific Transducer Corp
Pyro-Electric Inc
Pyro Service Co
Richards Co Arklay S
Slocomb Co J T
Smith Mfg Co Inc
Thermo Electric
Thermo Products Co
Trinity Equipment
West Instrument

THERMOMETERS, Dial, Bi-metal

Bacharach Indus Instr
Dillon & Co W C
Eastman Kodak
Fischer & Porter Co
Manning Maxwell & Moore
Marsh Instr Co
Marshall Instrs
Moeller Instr
Nurnberg Scientific
Pacific Transducer Corp
Palmer Thermometers
Powers Regulator
Precision Thermometer
Royco Instruments Inc
Taylor Instrument
Weksler Instruments
Weston Instruments

THERMOMETERS, Dial, Gas, Mercury, Organic Liquids, Filled, or Vapor-pressure

Bacharach Indus Instr
Brinkmann & Co., C. A.
Dickson Co
Dillon & Co W C
Electric Auto-Lite
Fischer & Porter Co
Foxboro Company
Green Instrs Henry J
Greiner Co Emil
John-son Service Co
Manning Maxwell & Moore
Marsh Instr Co
Moeller Instr
Moore Products Co
Nurnberg Scientific
Pacific Transducer Corp
Palmer Thermometers
Partlow Corp
Philadelphia Scien Glass
Powers Regulator
Scientific Instrument
Seegers Mfg
Taylor Instrument
Tel-Tru Mfg
Testing Machines Inc
U S Gauge Div
Weksler Instruments
Weston Instruments

THERMOMETERS, Electrical Resistance, Indicating, Recording and/or Controlling

Aero Research Instr
Arnoux Corp
Astra Technical Instr
Atkins Technical Inc
Bacharach Indus Instr
Bailey Meter Co
Barber-Colman
Brinkmann & Co C A
Bristol Co
Edison Industries T A
Electric Auto-Lite
Fischer & Porter Co
Fischer Scientific
Foxboro Company
GE Apparatus Sales Div
Hallikainen Instrs
Hays Corporation
High Temperature Instrs
Illinois Testing Labs
Leeds & Northrup
Lewis Engrg Co
Manning Maxwell & Moore
Mineo Products
M-H Brown Instrs Div
Natl Time & Signal
Norwood Controls
Pacific Transducer Corp
Ruge Associates
Ryan Recording Thermom
Swartwout Co
Thermo Electric
Trans-Sonics
United Control Corp
United Electric Controls
West Instrument
Weston Instruments
Westronics Inc

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Atkins Technical Inc
Bacharach Indus Instr
Brinkmann & Co C A
Eastman Kodak
Ever Ready
Fischer Scientific
Green Instrs Henry J
Griebel Co
H-B Instrument
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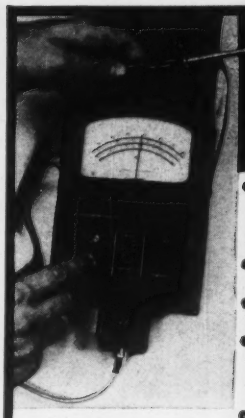
Martin & Co H S
Moeller Instr
North Atlantic Indus
Nurnberg Scientific
Pacific Transducer Corp
Palmer Thermometers
Philadelphia Scien Glass
Precision Thermometer
Scientific Glass App
Scientific Instrument
Tagliabue Mfg Co
Taylor Instrument
U S Gauge Div
Weiss & Son Inc
Weksler Instruments

THERMOMETERS, Indicating, Pressure-spring

Barber-Colman
Bristol Co
Dickson Co
Marshalltown Mfg
Moeller Instr
Nurnberg Scientific
Pacific Transducer Corp
Palmer Thermometers
Pimex Inc
Powers Regulator
Seegers Mfg
Taylor Instrument



Thermophil
THERMISTOR THERMOMETERS

- **ACCURACY (of complete system):** 1/3% to 2/3% of total Scale Range. Readability: .5 F° on 400 F° span instruments. .1 F° on 55 F° span instruments.
- **SCALE LENGTH:** 8-1/2" on three overlapping scales; 11-1/2" on four scale instruments.
- **FASTEST RESPONSE:** .7 sec. time constant in liquids; 2.2 sec. on surfaces.
- **ONE HUNDRED INTERCHANGEABLE PROBES, TWENTY-SIX INSTRUMENTS,** Readings between —148°F and +845°F or —100°C and +450°C.
- **BATTERY or AC powered.**
- **STABLE EUROPEAN THERMISTOR** resistance element, bridge circuit and amplifier.

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INTRODUCTORY OFFER
COMPLETE $180.00
Satisfaction Guaranteed

Instrument as pictured, °F. or °C.
Temperature range; overlapping:

	Model # 4412F	Model # 4412C
Scale I	32° to 158°F	0° to 70°C
Scale II	158° to 284°F	70° to 140°C
Scale III	284° to 410°F	140° to 210°C

with one probe, choice of { # H10AO stainless steel for surfaces; # H01AF glass tipped for liquids; # H12AF stainless steel needle

ATKINS TECHNICAL, INC.
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TRI-R
Electronic
THERMOMETER
THERMISTOR TYPE

Rapid, accurate, low-cost, remote reading thermometer with many ranges and probes for medical, industrial and laboratory applications.

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PRECISION INSTRUMENTS

for

RESEARCH and DEVELOPMENT

- Air Samplers
- Dill Dust Spot Tester
- Micro Bellows Pumps
- Setchkin Self-Ignition Apparatus
- Integrators and Recorders
- Relays and Thermoregulators
- Fixed Temperature Thermostat
- Electrical Timing Devices
- Test Stands for Lubricants (Cutting Fluid, Hydraulic, Demulsibility)
- Variable Speed Motors

Write for bulletins on any of these measuring and regulating instruments . . . OR . . . if you have a problem in precision instrument machining, please call on us.

RESEARCH APPLIANCE COMPANY

Specialists in Research Apparatus

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U S Gauge Div
Weksler Instruments
Weston Instruments

THERMOMETERS, Maximum and Minimum Registering

Accuracy Scientific
Bacharach Indus Instr
Brinkmann & Co C A
Green Instrs Henry J
H-B Instrument
Manning Maxwell & Moore
Marshall Instrs
Moeller Instr
Nurnberg Scientific
Pacific Transducer Corp
Palmer Thermometers
Pimex Inc
Scientific Instrument
Taylor Instrument
Weksler Instruments
Weston Instruments

THERMOMETERS, Recording and /or Controlling, Filled Systems

American Meter Co
Bailey Meter Co
Barber-Colman
Brinkmann & Co C A
Bristol Co
Dickson Co
Electric Auto-Lite
Fischer & Porter Co
Foxboro Company
Green Instrs Henry J
Johnson Service Co
Manning Maxwell & Moore
Mason Neilan
M-H Brown Instrs Div
Moeller Instr
Moore Products Co
Pacific Transducer Corp
Palmer Thermometers
Partlow Corp
Pimex Inc
Powers Regulator
Scientific Instrument
Taylor Instrument
United Electric Controls
U S Gauge Div
Weksler Instruments
Weston Instruments

THERMOMETERS, Surface

Aero Research Instr
Atkins Technical Inc
Bristol Co
Foxboro Company
Green Instrs Henry J
Illinois Testing Labs
Minco Products
Moeller Instr
Nurnberg Scientific
Pacific Transducer Corp
Precision Thermometer
Pyrometer Instr Co

BAILEY

Resistance Thermometer

• Platinum resistance temperature element measures —400F to + 1200F; transmits to precalibrated "plug-in" type receivers in Bailey a-c PYROTRON Receiver Recorder.

One to four continuous temperature records are made on a single 12 in. circular chart. Each recording pen responds instantly since it is controlled by a separate inertia-free electronic detector. Each detector has its own power supply. A small reversible electric motor balances the a-c Wheatstone bridge circuit, and drives the indicating, recording, and controlling features. The Bailey a-c PYROTRON Receiver Recorder may be furnished with pneumatic or electrical control.

Any combination of electrically or pneumatically transmitted factors may be combined with temperature in the same recorder which features continuous, one-year, automatic inking.

Request Product Specification E12-5 for Receiver Recorder and E51-6 for Resistance Temperature Elements and Protecting Wells

BAILEY METER COMPANY

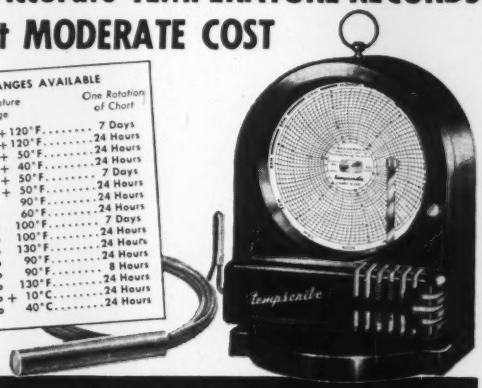
1041 IVANHOE ROAD CLEVELAND, O.

Bailey Meter Company Ltd. Montreal, Canada

CIRCLE 127 ON READER-SERVICE CARD

For Accurate TEMPERATURE RECORDS at MODERATE COST

RANGES AVAILABLE	
Temperature Range	One Rotation of Chart
—30° to +120°F	7 Days
—30° to +120°F	24 Hours
—30° to + 50°F	24 Hours
—20° to + 40°F	7 Days
—10° to + 50°F	24 Hours
—10° to + 50°F	24 Hours
10° to 90°F	24 Hours
30° to 60°F	7 Days
40° to 100°F	24 Hours
40° to 100°F	24 Hours
50° to 130°F	24 Hours
60° to 90°F	24 Hours
60° to 90°F	8 Hours
70° to 130°F	24 Hours
—25° to + 10°C	24 Hours
5° to 40°C	24 Hours



Use TEMPSCRIBE Recorders

BULB-TYPE (illustrated)—*For recording temperatures at a distance*
BI-METAL TYPE—*For recording temperatures in surrounding air*

- ✓ Portable—easily carried. Can be set on flat surface or hung on wall.
- ✓ Spring-wound instrument-type clock: 3 standard movements—8 hours, 24 hours or 7 days.
- ✓ Instrument measures 4½" x 5½" x 7½"; uses 4¼" diameter charts.
- ✓ Chart graduations easy-to-read; spaced uniformly over full range.
- ✓ Pen and its actuating components are in door. Doors are completely interchangeable to convert to any temperature range, or from bi-metal type to bulb-type.

Also available: (1) Interchangeable door with electro-magnetic armature to record running time of motors, burners, solenoid valves, etc. (2) Two-pen doors for recording temperature and electrical operation on same chart.

Write for Leaflets 786 and 872

BACHARACH INDUSTRIAL INSTRUMENT CO.

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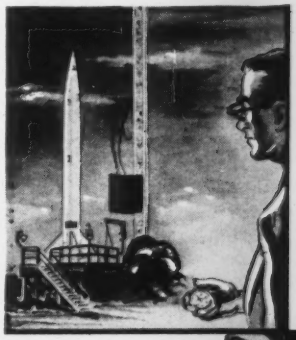
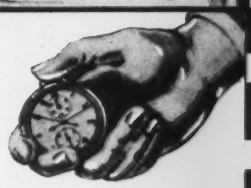


Since 1890...the World's Largest Selections of

TIMERS

have been offered by

RACINE



GALLET TIMERS

CHRONOGRAPHS

- FOR RESEARCH
- FOR PRODUCTION

Write for CATALOG

JULES RACINE & COMPANY, INC.

Specialists in Fine Timers

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At Scientific Supply Firms. If unobtainable locally, write us.

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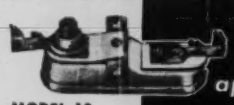
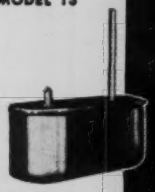
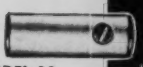
Rugged, Precision MINIATURE THERMOSTATS



MODEL 13



MODEL 24



MODEL 11

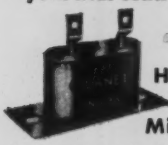
For your precise applications:

- MISSILES
- ELECTRONIC CONTROL
- AIRCRAFT
- COMPUTERS
- AUTOPILOTS
- TRANSISTOR PROTECTION

Illustrations shown full size

★ Hermetically Sealed
★ Strain Relief Protected

The quality of Ulanet miniature thermostats has been proved by years of dependable operation under the most extreme conditions. Their inherent accuracy and rapid response has been the leading reason for their final choice in so many critical applications. Get in touch with Ulanet for the answer to your heat control problems.



NEW!
Hermetically Sealed Surface-Sensing Miniature Thermostat

The only unit that meets the most stringent aircraft and military applications.

Send for Bulletin 100 for full details and dimensional drawings.

FM Series—The only metal thermostats that withstand mechanical clamping or pinching of cartridge without affecting set calibration.

FM Series

Write for Technical Data Sheets

SINCE 1931 ULANET ELECTRIC HEAT CONTROL ENGINEERS

GEORGE ULANET COMPANY
419 Market St., Newark, N. J.
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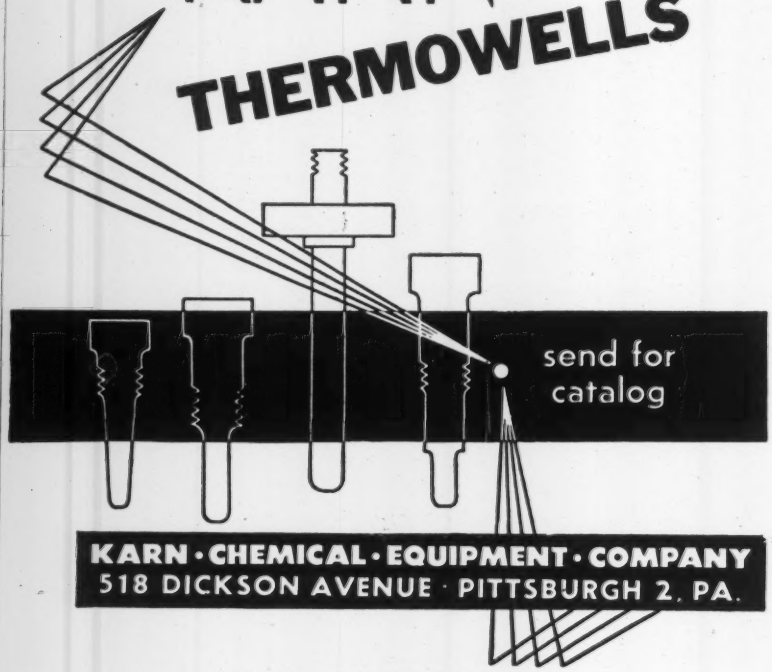
KARN THERMOWELLS



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Radiation Electronics
Royco Instruments Inc
Ruge Associates
Trans-Sonics
Weksler Instruments
Weston Instruments
Yellow Spring Instr

THERMOMETERS, Thermistor (see also Thermistors—Cat. 8)

Aero Research Instr
Atkins Technical Inc
Brinkmann & Co C A
Electro-Medical Lab
Marshall Instrs
Precision Thermometer
Royco Instruments Inc
Simpson Electric
Tri-R Instruments
Victory Engrg Corp
Yellow Spring Instr

THERMOSTATS

Accuracy Scientific
Barber-Colman
Brabender Instr C W
Brinkmann & Co C A
Burling Instrument
Control Products
Controls Co of Amer
Deutsch Co
E-T-A Products
Edison Industries T A
Fenwal Inc
Fulton Sylphon Div
G-V Controls
General Controls
H-B Instrument
Johnson Service Co
Leslie Co
Mercoid Corp
Metals & Controls Div
Modern Lab Equipment
Norwood Controls
Nurnberg Scientific
Philadelphia Scien Glass
Pimex Inc
Powers Regulator
Stevens Mfg Co
Temperature Engrg Corp
Ulanet Co George
United Aircraft Prods
United Control Corp
United Electric Controls
Yellow Spring Instr

THERMOWELLS

Aero Research Instr
Bristol Co
Dillon & Co W C
Edison Industries T A
Foxboro Company
Gordon Co Claud S
Industrial Instr Corp
Karn Chemical Equipt
Leeds & Northrup
Martin & Co H S
McHugh & Son Raymond F
Moeller Instr
Pacific Transducer Corp
Richards Co Arklay S
Temperature Engrg Corp
Thermo Electric
Trinity Equipment
West Instrument
Weksler Instruments

TIME RECORDERS, including Running Time, Time Operation, Time Totalizers, etc.

Alina Corp
Bacharach Indus Instr
Bailey Meter Co
Bergen Labs Inc
Bristol Co
Brush Instruments Div
Capeway Instrument
Cincinnati Time Recorder
Cramer Controls
Curtiss Wright
Dickson Co
Ducommun Co M
Electric Tachometer
Electro Autosizing
Electro-Medical Lab
Engler Instr
Esterline-Angus
Federal Pacific
Fischer & Porter Co
Foxboro Company
General Controls
GE Apparatus Sales Div
Geotechnical Corp
Gilmore Industries
Haydon Co A W
Hobbs Corp John W
Impact-O-Graph Corp
Industrial Timer Corp
Lafayette Instr
Mast Development
Micronics Div
Parabam Inc
Sheffield Corp
Standard Instrument
Stieht Co Herman
Stromberg Time Corp
Thompson Clock Co
US Gauge Div
Weksler Instruments
Westinghouse Electric
Weston Instruments

TIME STUDY APPARATUS

Camera Equipt Co
Ducommun Co M
Engler Instr
Fischer & Porter Co
Lafayette Instr
Standard Instrument

TIMERS, including Automatic Reset, Cycle Interval (see also Program Controllers)

Abrams Instrument
Alina Corp
Allen-Bradley
Amglo Corp
Amadex Instruments Inc
Automatic Electric
Automatic Timing & Contls
Bald Eagle Corp
Beckman/Berkeley Div
Bergen Labs Inc
Bernco Engrg Corp
Black Sivalls & Bryson
Bristol Co
Bulova Research
Bulow Electric
Clark Controller
Controls Co of Amer
Cooper Development
Cramer Controls
Cutler-Hammer
Designers For Industry
Dl/An Controls
Dietz Co Henry G
Dimco-Gray
Dynatronics Inc
Eagle Signal
Edwards Co Inc
Electric Eye Equip
Electro Instruments
Electro Precision
Engler Instr
Erie Pacific
Erie Resistor
Ewald Instruments
Falcon Alarm Co
Farmer Electric
Fischer & Porter Co
General Controls
GE Apparatus Sales Div
General Mills Inc
Gordon Enterprises
Hamilton Watch Co
Haydon Co A W
Haydon Div Gen Time
Hub-Pot Inc
Industrial Timer Corp
International Instrument
Karnish Instr Sales
Labline Inc
Machinery Electrification
Mallory & Co P R
Marsh Instr Co
Mast Development
Master Specialties
Micronics Div
Minarik Electric
Montgomery Mfg
Natl Time & Signal
Nuclear-Chicago
Nucleonic Corp of Amer
Paragon Electric
Partlow Corp
Philco Corp
Post Electronics

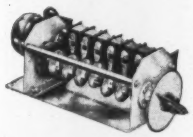
When Using This Guide look under the variable, e.g., Pressure Gages (not Gages, Pressure); or look under the noun—Magnets, Permanent (not Permanent Magnets).

Zenith AUTOMATIC CONTROL EQUIPMENT

. . . accurate . . . dependable . . .

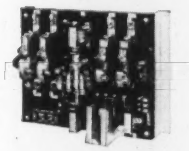
EASY TO ADJUST

ZENITH MULTI-CIRCUIT CYCLE TIMERS



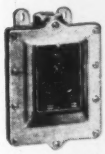
Specially designed to accurately time any electrical operation. Set for on and off periods with as many circuits as desired. Operation: Cam-driven S.P.-D.T. micro-switch bank with synchronous motor. Also furnished without motor for elevator control, limit switch, etc.

ZENITH AUTOMATIC TRANSFER SWITCHES



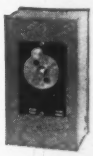
Automatic transfer to emergency source in 1/25th second . . . automatic return to normal voltage when restored. Supplied ac. or dc. Capacities up to 600 amps.

ZENITH INTERVAL TIMERS— MANUALLY PRE-SET



No clock springs to wind or break . . . powerful, self-starting, slow-speed, synchronous motor insures dependable operation. Timing ranges from 1 minute to 120 hours. 115 and 230 volt models. Explosion proof case shown meets National Electrical Code for Class 1, Group D., Hazardous Locations. Capacity: 1000 watts.

ZENITH RESET TIMERS— AUTOMATIC, REMOTE CONTROL



Easily pre-set, automatically reset. Synchronous motor opens and closes circuits as pre-set. May be used as timer in conjunction with standard start-stop push button station. Choice of mountings. Capacity: 1000 watts.

ZENITH PROCESS TIMER— with new PERCENTAGE CALIBRATION

For Hold Fire Control, Mixing Machinery, Testing Equipment, Fans, Heaters, etc. Wide variety of models for all types of adjustable automatic cycle timing. Total time cycle from 15 seconds to 24 hours, with range of adjustability to 94% for ON or OFF periods.

ZENITH AUTOMATIC CONTROL EQUIPMENT

Transfer Switches, Remote Control Switches, Automatic Time Switches, Automatic Reset Switches, Magnetic Contactors, Interval Timers, Process Timers, Program Clocks, Reversing Starters, Impulse Timers. Special Automatic Control Equipment For Special Jobs.

Request new catalog on Zenith Automatic Control Equipment. See classified telephone directory for local distributors.

ZENITH ELECTRIC CO.
159 W. WALTON ST., CHICAGO 10, ILLINOIS

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Racine & Co
Radiation Instr Dev Lab
Redford Corp
Rhodes Inc M H
Sanders Labs
Sangamo Electric Co
Scientific Industries
Seely Instrument
Standard Electric Time
Streeter Amet
Stromberg Time Corp
Taylor Instrument
Telechrome Mfg Corp
Tempo Instrument
Thompson Clock Co
Trott Electronics
Unit Process Assemblies
U S Gauge Div
Wang Laboratories
Westinghouse Director Sys
Weston Instruments
Wilson & Co G C
Zenith Electric

TIMERS, Misrosecond (sse also Counters, Electronic)

Applied Science Corp
Automatic Timing & Contls
Beckman/Berkeley Div
Computer Equipment
Corbett Science Labs
Curtiss Wright
Designers For Industry
Di/An Controls
Dynajar Corp
Engineered Electronics
Erie Pacific
Erie Resistor
Fischer & Porter Co
General Devices
Hamner Electronics
Haydon Co A W
Hewlett-Packard
Link Aviation
Machinery Electrification
Micronics Div
Northeastern Engrg
Philco Corp
Standard Electric Time
Sticht Co Herman
Systron Corp
Telechrome Mfg Corp
Trott Electronics
Sunshine Scientific

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B & F Instruments
Bergen Labs
Bulova Research
Bytrex Corp
Chatillon John
Emery & Co A H
Enris Equipment
Jo Line Tools
Metron Instrument
Performance Measurements
Sunshine Scientific
Universal Match
Vickers Electric Prods Div

TOTALIZERS, Demand

Disc Instruments
Fischer & Porter Co
GE Apparatus Sales Div
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TOTALIZERS, Electric Energy

Fischer & Porter Co
Sangamo Electric Co

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Kahn & Co
Kieley & Mueller

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DuMont Labs Allen B
Phoenix Precision Instr
Process & Instruments
Spectra Electronics
Western Radiation Lab
Weston Instruments
Westronics Inc

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Bush Associates G F
Davenport Mfg
Epic Inc
Gaertner Scientific
Gates & Co Inc
Greiner Co Emil
Kemlite Labs
Mico Instr Co
Phoenix Precision Instr
Research Inc
Stocker & Yale
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Applied Radiation Corp
Cash Valve Mfg
Central Scientific
Consol Electrodynamics
Electric Hotpack
Fisher Scientific
Gelman Instrument
Granville-Phillips
Green Rectifier
Greiner Co Emil
Hastings-Raydist
Ipsen Industries
Kahn & Co
Langmar Corp
Leiman Bros Inc
Martin & Co H S
Nash Engineering
National Appliance Co
NRC Equipment
Red Point Corp
Rochester Div CEC
Scientific Glass App
Smith Inc Arthur F
Temperature Engrg Corp
United Electric Controls
Vacuum Instrument
Vacuum Research
Varian Associates
Veeco Vacuum
Welch Scientific
Wheeler Mfg Co C H

VACUUM GAGES, McLeod

Central Scientific
Consol Electrodynamics
Ellison Draft Gage
GE Apparatus Sales Div
Greiner Co Emil
Hughes Products
Martin & Co H S
Moeller Instr Co
Nuclear Corp of Amer
Nurnberg Scientific
Rochester Div CEC
Scientific Glass App
Smith Inc Arthur F
Temperature Engrg Corp
Welch Scientific

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Alfred Electronics
Applied Radiation Corp
Associated Valve Co
Barber-Colman
Central Electronic Mfgrs
Consol Electrodynamics
Ellison Draft Gage
Fischer & Porter Co
Fulton Sylphon Div
General Controls
Green Rectifier
Greiner Co Emil
Hastings-Raydist
Martin & Co H S
NRC Equipment
Nuclear Corp of Amer
Rochester Div CEC
Smith Inc Arthur F
Temperature Engrg Corp
United Electric Controls
Vacuum Instrument
Vacuum Research
Welch Scientific
Weston Instruments
Westronics Inc
Winslow Company Inc

TIMERS

FOR INDUSTRIAL PROCESS CONTROL

Standard, off-the-shelf timers for every control application, *plus* complete design and engineering for special requirements. Hundreds of models available, miniature to complete control panels. Rugged, dependable. Large knobs for easy setting, unique dial and pointer design for faster, more accurate readings. Easy one-hole mounting on most models. All time cycles from split seconds to days.

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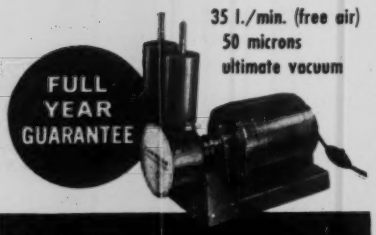
atc AUTOMATIC TIMING & CONTROLS, INC.
KING OF PRUSSIA, PENNA.
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

CIRCLE 132 ON READER-SERVICE CARD



3 important reasons why the LANGDON Vacuum Pump is replacing other makes!

1. No other laboratory vacuum pump can be cleaned in 30 minutes
2. No other laboratory vacuum pump permits oil change while running
3. No other laboratory vacuum pump uses ordinary SAE 30 motor oil

The LANGDON Vacuum Pump, for laboratory use, has attracted the interest, attention, and use by hundreds of organic research chemists because of its unique simplicity of design and ease of operation. Single stage, rotary, oil-sealed, water-cooled, high speed (1725 r.p.m.). No maintenance. No spare parts. Nothing to corrode or wear out. Positively noiseless. Uses only 50 cc of ordinary SAE 30 motor oil which is quickly changed while the pump is on stream. Every chemist can disassemble, clean and re-assemble in 30 minutes. The LANGDON operates at 35 l./m. (free air) to produce an ultimate vacuum of 50 microns. Permanently non-fouling. No springs to rust or corrode. "It looks as though you may have found the solution to the problem of distilling organic compounds", writes one user. "We use the LANGDON Pump to distill liquids which can decompose slightly in distillation, releasing halogen acids which shorten the life of a pump unless a good trap is included in the set up; we use no trap with the LANGDON", writes another user. It's no wonder, then, that the LANGDON is now successfully being used in the laboratories of hundreds of the largest chemical and petroleum companies, U. S. Government institutions and military installations and chemistry laboratories of colleges and universities in the U. S. and Canada. Under our guarantee, we will repair or replace without charge for one year any LANGDON Pump that fails to operate according to our specifications. Find out for yourself why this exceptional laboratory instrument is proving by its performance under a wide variety of operating conditions that it has unequalled superiority in the normal operating range of .5mm. and above. We shall be pleased to send you our illustrated, descriptive brochure, user list and operating instructions. Write today to: ***LANGMAR Corporation, 4875 West Armitage Avenue, Chicago 39, Ill.***

CIRCLE 133 ON READER-SERVICE CARD

New Hyge slashes cost of production-line *shock* tests

COSTS LESS, TESTS MORE
This new Hyge Shock Tester gives you two most widely specified shock pulses: 11 ± 1 ms ½ Sine, and 6 ± .5 ms Sawtooth . . . yet costs less than single-test units!

5 SHOTS IN 5 MINUTES, 5¢ APIECE
Low-cost bottled nitrogen powers the fast cycle . . . ready for the next shot in less than a minute!

EXCLUSIVE! FAST, EXTERNAL CHANGE OF WAVEFORM
Only this new Hyge changes waveform and thrust level without disassembly in a matter of minutes.

WIDEST TEST RANGE
From gram-weight components up to bulky 150-pound objects. Maximum acceleration 100G. Capacity: 15000 pounds specimen thrust.

COMPACT, CAN BE BUILT INTO PRODUCTION LINE
Height: 29¼". Base: 13" square.

Write for new Hyge Bulletin 4-71.

Consolidated Vacuum Corporation

ROCHESTER 3, NEW YORK

A SUBSIDIARY OF CONSOLIDATED ELECTRODYNAMICS CORPORATION
(FORMERLY ROCHESTER DIVISION)

CIRCLE 134 ON READER-SERVICE CARD

VACUUM CONTROL TO .05 PSI

The Conoflow VH-20 Vacuum Regulator can solve your problem of controlling vacuum in low capacity systems. Ideal for laboratory work, and for test stands, especially where accurate simulation of high altitude conditions is required. Holds absolute pressure to as low as 1 inch ±.05 inches mercury. Provides quick, easy adjustment on dead end or low flow service.

Available from stock in ¼ inch size, of forged brass and stainless steel construction. PRICE $25.00. Discounts for quantities. Instruction bulletin included with order.

Cono-Controls FOREMOST IN FINAL CONTROL ELEMENTS

WRITE FOR BULLETIN H-2 ON PNEUMATIC REGULATORS

CC-606

CONOFLOW CORPORATION

SUBSIDIARY OF WALWORTH COMPANY

2100 ARCH STREET • PHILADELPHIA 3, PA.

CIRCLE 135 ON READER-SERVICE CARD

VACUUM CONTROLLERS, INDICATORS and/or RECORDERS

Bailey Co Chas M
Bailey Meter Co
Barber-Colman
Bristol Co
Cash Valve Mfg
Conoflow
Consol Electrodynamics
Crosby-Ashton
Dickson Co
Esterline-Angus
Fischer & Porter Co
Fulton Sylphon Div
GPE Controls
General Controls
GE Apparatus Sales Div
Hastings-Raydist
Hays Corporation
Helcoid Gage Div
International Register
Kieley & Mueller
Manning Maxwell & Moore
Mason Neilan
M-H Brown Instrs Div
Moore Products Co
Murphy Mfg Inc
NRC Equipment
Norwood Controls
Nuclear Corp of Amer
Precision Thermometer
Rochester Div CEC
Scientific Instrument
Smith Inc Arthur F
Specialties Inc
Taylor Instrument
Temperature Engrg Corp
Veeco Vacuum
Wallace & Tiernan
Weksler Instruments
Welch Scientific
Weston Instruments
Westronics Inc

VACUUM-OPERATED DEVICES, Electric Motor

Cash Valve Mfg
General Controls
GE Apparatus Sales Div
Hammel-Dahl Div
United Electric Controls

VALVE OPERATING DEVICES, Hydraulic including Cylinder

Acme Industrial Co
Annin Company
Arkwin Industries Inc
Automatic Switch Co
Cash Valve Mfg
Defender Instrument
Denison Engrg Div
DeZurik Corp
Eastern Industries
Electric Eye Equip
Ferguson Hille
General Controls
General Regulator
Grove Valve & Regulator
Hydromatics Inc
Jamesbury Corp
Kieley & Mueller
Ledeen Inc
Manning Maxwell & Moore
Midwestern Instrs
M-H Valve Div
Model Engrg
North American Mfg
Oilgear Co
PKL Valve & Mfg
Pneu-Hydro Valve
Research Controls
Rockwell Mfg Co
Stratos Div
Taylor Instrument
United Aircraft Prods
Vickers-A & E Center
Vinson Mfg Co
Weston Hydraulics Ltd

VALVE OPERATING DEVICES, Pneumatic, including Cylinder

American Meter Co
Annin Company
Arkwin Industries Inc
Associated Valve Co
Automatic Switch Co
Automatic Valve Co
Bailey Meter Co
Black Sivalls & Bryson
Bristol Co
Cash Co A W
Cash Valve Mfg
Conoflow
Dahl Co Geo W
DeZurik Corp
Edward Valves Inc
Ferguson Hille
Fisher Governor
Foxboro Company
Fulton Sylphon Div
GPE Controls
General Controls
General Regulator
Grove Valve & Regulator
Hammel-Dahl Div
Hankison Corp
Haveg Industries
Hydromatics Inc
Jamesbury Corp
Johnson Service Co
Kieley & Mueller
Leslie Co
Mason Neilan
M-H Valve Div
Model Engrg
Moore Products Co
North American Mfg
Pneu-Hydro Valve
Powers Regulator
RKL Valve & Mfg
Research Controls
Rockwell Mfg Co
Seely Instrument
Stratos Div
Taylor Instrument
United Aircraft Prods
Vinson Mfg Co
Weston Hydraulics Ltd

VALVE OPERATING DEVICES, Solenoid

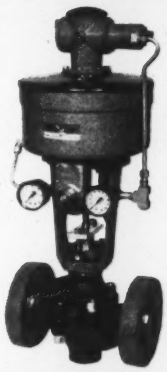
Acme Industrial Co
Altair Inc
Amer Meas & Control
Arkwin Industries Inc
Automatic Switch Co
Automatic Valve Co
B-I-F Industries
Carruthers & Fernandez
Conoflow
Detroit Controls
Ferguson Hille
Foxboro Company
General Controls
General Regulator
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Johnson Corp
Koontz-Wagner Elec
Norwood Controls
Pneu-Hydro Valve
Skinner Elec Valve
United Aircraft Prods
Vacuum Research
Vickers-A & E Center
Vinson Mfg Co
Weston Hydraulics Ltd.

VALVE POSITIONERS

Annin Company
B-I-F Industries
Bailey Meter Co
Barber-Colman
Bristol Co
Cash Co A W
Conoflow
Detroit Controls
Electric Regulator
Ferguson Hille
Fisher Governor
Foxboro Company
Fulton Sylphon Div
GPE Controls
General Controls
General Regulator
Hagan Chem & Controls
Hammel-Dahl Div
Haveg Industries
Johnson Service Co
Kieley & Mueller
Leeds & Northrup
Manning Maxwell & Moore
Mason Neilan
Model Engrg
Moore Products Co
Pneu-Hydro Valve
Powers Regulator
Redford Corp
Reliance Instr Mfg
Rockwell Mfg Co
Tejax Engrg Corp
Taylor Instrument

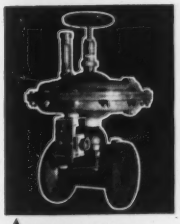
YEARS AHEAD IN DESIGN . . .

CONTROL VALVES BY CONOFLOW



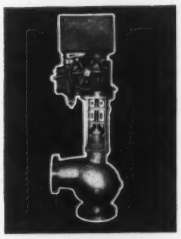
← SERIES LB CONTROL VALVES

- Integrated body-actuator design outmodes conventional valves.
- Cono J Positioner sets new standard for precise proportional positioning.
- Extra-thick body walls give added protection against corrosion and erosion.



↑ SERIES HB SAUNDERS VALVES

In all sizes for on-off and throttling control.



← SERIES S CONTROL VALVES

Specifically designed for the tough services.

SERIES AB → CONTROL VALVES

For economical handling of small flows.

SPECIFY Conoflow Control Valves to get the best valves available for your control application. Write today for Control Valve Bulletins I-A.

CC606

Cono-Controls FOREMOST IN FINAL CONTROL ELEMENTS

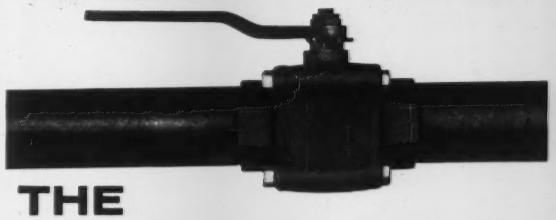
CONOFLOW CORPORATION

SUBSIDIARY OF WALWORTH COMPANY

2100 ARCH STREET • PHILADELPHIA 3, PA.

CIRCLE 136 ON READER-SERVICE CARD

COMPARE



THE ECON-O-MISER BALL VALVE . . . with LUBRICATED PLUG VALVES

The **ECON-O-MISER** ball valve provides smooth, round, **two-way flow! Easy to service without removal from the line . . .** half million cycles not unusual . . . acts as both valve and union.

For revealing facts request bulletin EB 101.

WORCESTER

VALVE CO., INC. / WORCESTER 10, MASS.

CIRCLE 137 ON READER-SERVICE CARD

United Aircraft Prods
U S Gauge Div
Vinson Mfg Co

VALVES, Ball

Hydromatics Inc
Jamesbury Corp
Worchester Valve

VALVES, Butterfly

Aeronaut & Instr Div
B-I-F- Industries
Baldwin-Lima-Hamilton
Black Sivalls & Bryson
Conoflow Corp
Consol Controls Corp
Continental Equipment
Dahl Co G W
Eclipse Fuel Engrg Co
Fisher Governor Co
Foxboro Co
Hammel-Dahl Div
Haveg Industries
Johnson Service Co
Kelley & Mueller
Mason-Neilan Div
M-H Valve Div
Rockwell Co W S
Schutte & Koerting
Stratos Div

VALVES, CONTROL

Acme Industrial Co
Allenair Corp
Allis-Chalmers
Amer Meas & Control
Annin Company
Arkwin Industries Inc
Associated Valve Co
Atlas Valve Co
Automatic Valve Co
B-I-F Industries
Bailey Co Chas M
Barber-Colman
Barksdale Valves
Black Sivalls & Bryson
Bristol Co
Cash Co A W
Cash Valve Mfg
Conoflow
Continental Equipment
Controls Co of Amer
Dahl Co Geo W
Daniel Orifice Fitting
Denison Engrg Div
Deutsch Co
DeZurik Co
Eastern Industries
Eclipse Fuel Engrg
Edward Valves Inc
Electric Regulator
Ferguson Hille
Energy Kontrols
Fischer & Potter Co

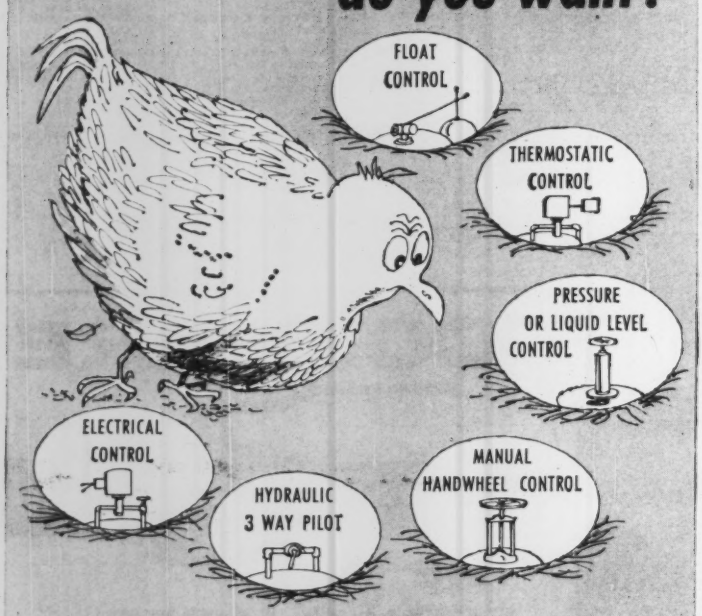
Fisher Governor
Foxboro Company
Fulton Sylphon Div
Golden Anderson
General Controls
Granville-Phillips
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Hays Mfg Co
Hoke Inc
Humphrey Products Div
Imperial Brass Mfg
Industrial Engrg Corp
Infilco Inc
Instr Development Co
Johnson Service Co
Keckley Co O C
Kieley & Mueller
Klipfel Valves
Koontz-Wagner Elec
Ledeen Inc
Leonard Inc Wallace O
Leslie Co
Linear Controls
Mason-Neilan
Marotta Valve
McIlvaine O T
M-H Valve Div
Model Engrg
North American Mfg
OPW-Jordan
Oilgear Co

PK Industries
Partlow Corp
Petrometer Corp
Pneu-Hydro Valve
Powers Regulator
RKL Valve & Mfg
Research Controls
Reliance Instr Mfg
Robbins Aviation Inc
Seely Instrument
Simmonds Aerocessories
Taylor Instrument
Uniflow Valve
United Aircraft Prods
Universal Match
Vacuum Research
Valcor Engrg Corp
Vanton Pump & Equip
Versa Products
Vickers—A & E Center
Vinson Mfg Co
Weston Hydraulics Ltd

VALVES, Diaphragm Seal, including Saunders Patent, Crane, Wynn Type, etc.

Annin Company
Associated Valve Co
Automatic Switch Co
Black Sivalls & Bryson
Bristol Co
Cash Valve Mfg

Which CONTROL do you want?



For Automatic VALVE Operation

Designed to automatically operate with any control, G-A cushioned valves are available in sizes 2" thru 30" for special fluid control applications. You should have our complete catalog on file—write today.

GOLDEN ANDERSON Valve Specialty Company

1210 RIDGE AVENUE, PITTSBURGH 33, PA.

Designers and Manufacturers of VALVES FOR AUTOMATION

CIRCLE 138 ON READER-SERVICE CARD

Conoflow
Dahl Co Geo W
Grinnell Co
Grove Valve & Regulator
Haveg Industries
Hills-McCanna
Hoke Inc
Humphrey Products Div
Hydromatics Inc
Imperial Brass Mfg
Kieley & Mueller
Leslie Co
Mason Neilan
M-H Valve Div
Model Engrg
Nuclear Materials & Eqpt
Pneu-Hydro Valve
Powers Regulator
Research Controls
Taylor Instrument
Uniflow Valve
United Aircraft Prods
Vinson Mfg Co

VALVES, Flexible Sleeve

Farris Engrg Corp
Fisher Governor
Grove Valve & Regulator
Haveg Industries
International Instrument
Pneu-Hydro Valve
RKL Valve & Mfg
Red Jacket Co
United Aircraft Prods
Vinson Mfg Co

VALVES, Float-operated

Associated Valve Co
Atlas Valve Co
Bailey Co Chas M
Black Sivalls & Bryson
Clark Mfg
Defender Instrument
Fisher Governor
Fulton Sylphon Div
General Controls
Golden Anderson
Grove Valve & Regulator
Haveg Industries
Instruments Inc
Keckley Co O C
Kieley & Mueller
Klipfel Valves
Martin & Co H S
Mason Neilan
McDonnell & Miller
Model Engrg
Phillips & Co H A
Pneu-Hydro Valve
Simmonds Aerocessories
United Aircraft Prods
Vinson Mfg Co

VALVES, Gage Cocks

Defender Instrument
Detroit Controls
Edward Valves Inc
Grove Valve & Regulator
Haveg Industries
Keckley Co O C
Kunkle Valve Co
Marsh Instr Co

VALVES, High Pressure

Acme Industrial Co
Allis-Chalmers
Altair Inc
Annin Company
Arkwin Industries Inc
Associated Valve Co
Atlas Valve Co
Autoclave Engineers
Automatic Switch Co
Bailey Co Chas M
Barber-Colman
Barksdale Valves
Black Sivalls & Bryson
Carruthers & Fernandez
Cash Valve Mfg
Conoflow
Dahl Co Geo W
Daniel Orifice Fitting
Davies Brothers
Dennison Engrg Div
Detroit Controls
Deutsch Co
Dragon Engrg Co
Edward Valves Inc
Fisher Governor
Fulton Sylphon Div
General Controls
Golden Anderson
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Hoke Inc
Hydromatics Inc
Imperial Brass Mfg
Kahn & Co
Kieley & Mueller
Klipfel Valves
Koontz-Wagner Elec
Leonard Inc Wallace O
Leslie Co
Marotta Valve
Marsh Instr Co
Mercoid Corp
M-H Valve Div
Model Engrg
Oilgear Co
Pneu-Hydro Valve
Republic Mfg Co
Research Controls
Robbins Aviation Inc
Rockwell Mfg Co
Ruska Instrument Corp
Seely Instrument
Simmonds Aerocessories
Stratos Div
Taylor Instrument
Uniflow Valve
Universal Match
United Aircraft Prods
Valcor Engrg Corp
Velan Valve Corp
Vickers-A & E Center
Victor Equipment

Vinson Mfg Co
Weston Hydraulics Ltd
Yarnall Waring

VALVES, Plug

Allis-Chalmers
Arkwin Industries Inc
Bailey Meter Co
Circle Seal Products
Conant Bros Co
Conoflow
DeZurik Corp
Dragon Engrg Co
Edward Valves Inc
General Controls
Haveg Industries
Hoke Inc
Hydromatics Inc
Imperial Brass Mfg
Marotta Valve
Pneu-Hydro Valve
Republic Mfg Co
Rockwell Mfg Co
Simmonds Aerocessories
Taylor Instrument
United Aircraft Prods
Vacuum Research
Vanton Pump & Eqpt Corp
Vickers-A & E Center
Vinson Mfg Co
Worcester Valve

VALVES, Needle

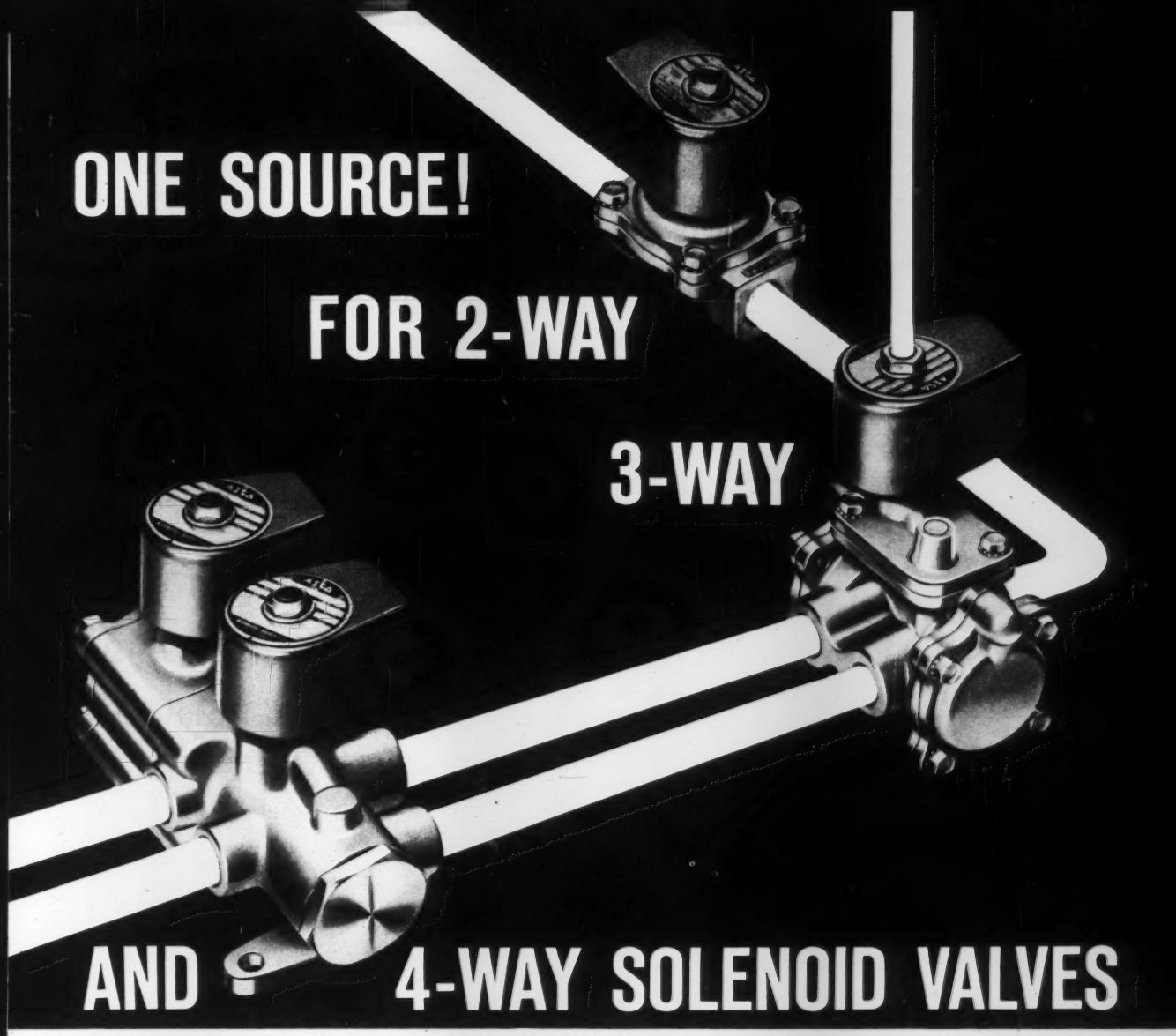
Allis-Chalmers
American Meter Co
Annin Company
Arkwin Industries Inc
Associated Valve Co
Autoclave Engineers
Automatic Switch Co
Bailey Meter Co
Dahl Co Geo W
Daniel Orifice Fitting
Dragon Engrg Co
Edward Valves Inc
Fulton Sylphon Div
General Controls
Greiner Co Emil
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Hoke Inc
Imperial Brass Mfg
Industrial Instr Corp
Kieley & Mueller
Manning Maxwell & Moore
Marsh Instr Co
Model Engrg
Pneu-Hydro Valve
Republic Mfg Co
Research Controls
Robbins Aviation Inc
Simmonds Aerocessories
Taylor Instrument
Uehling Instrument
Uniflow Valve
United Aircraft Prods
Versa Products
Vickers-A & E Center
Victor Equipment
Vinson Mfg Co

VALVES, Packless

Allenair Corp
Annin Company
Arkwin Industries Inc
Associated Valve Co
Automatic Switch Co
Conant Bros Co
Conoflow
Dahl Co Geo W
Defender Instrument
Fulton Sylphon Div
General Controls
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Henry Valve Co
Hills-McCanna
Hoke Inc
Imperial Brass Mfg
Kahn & Co
Kieley & Mueller
Leslie Co
Marsh Instr Co
Mason Neilan
Mercoid Corp
Pneu-Hydro Valve
Powers Regulator
Research Controls
RKL Valve & Mfg
Simplex Valve & Meter
Taylor Instrument
Uniflow Valve
United Aircraft Prods
Valcor Engrg Corp
Vinson Mfg Co
Weston Hydraulics Ltd

VALVES, Relief and Safety

Associated Valve Co
Arkwin Industries Inc
Automatic Switch Co
Bailey Co Chas M
Carruthers & Fernandez
Cash Co A W
Cash Valve Mfg
Circle Seal Products
Conax Corp
Conoflow
Crosby-Ashton
Dahl Co Geo W
Daniel Orifice Fitting
Denison Engrg Div
Eclipse Fuel Engrg
Edward Valves Inc
Farris Engrg Corp
Fisher Governor
Fulton Sylphon Div
General Controls
Golden Anderson
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries



When you discuss solenoid valve requirements with an ASCO engineer, you benefit from the design and development experience of half a century. The ASCO specialist can recommend the right valve for your needs because ASCO pioneering has brought about the thousands of types of solenoid valves now available:

Two-way valves in pipe sizes from ⅛″ to 8″—for temperatures from -350°F to 600°F—for pressures to 5000 p.s.i.

Three-way valves in pipe sizes from ⅛″ to 2″—for temperatures from -350°F to 600°F—for pressures to 1000 p.s.i.

Four-way valves in pipe sizes from ¼″ to 1½″—for temperatures from -65°F to 212°F—for pressures to 750 p.s.i.—poppet or slide type.

And ASCO can supply you with standard, explosion-proof or water tight enclosures—Class A and Class H coils—a wide range of body materials including cast iron, brass, bronze and stainless steel. Or trade on ASCO experience and have one of our engineers call.

New! Catalog No. 202 covers the ASCO line of Solenoid Valves. Write for your copy today.

For Immediate Delivery...

World's largest stock of Solenoid Valves. A complete Solenoid Valve Stock List will be sent to you with your copy of Catalog No. 202.

Whatever the crucial factor in your flow control applications—reliability, compactness, high cycling rate—there is an ASCO valve that meets your need.

Automatic Switch Co.

52-I Hanover Road, Florham Park, New Jersey, FRontier 7-4600

AUTOMATIC TRANSFER SWITCHES · SOLENOID VALVES · ELECTROMAGNETIC CONTROL

CIRCLE 139 ON READER-SERVICE CARD

ASCO®

DRAGON

SPECIALISTS IN NEEDLE VALVES

VALVES FOR...

- Liquid Gases
- Remote Control
- Corrosive Fluids
- Hydraulic Systems
- Pneumatic Systems

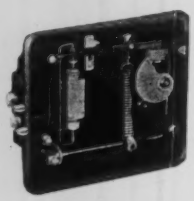
WIDE RANGE OF SPECS...

- Vacuum to 30,000 psi
- −320°F to +1200°F
- ⅛" thru 1" in NPT & AND-10050 Tubing Ends
- Made from Carbon Steel, 4140, Monel, Aluminum, Brass, and Stainless in types 303, 304, 316, 321, 347, 416, and Alloy 20
- Teflon & other packings
- Panel Mountings
- Manual and Air Operated
- Send for catalog

Dealers in All Major Cities

DRAGON
ENGINEERING CO., INC.
P. O. BOX 185
NORWALK, CALIF.

CIRCLE 140 ON READER-SERVICE CARD



BAILEY
POSITIONING RELAY

• Accurately positions a control valve or drive to the control requirements as received pneumatically from the control station. Also included is a cam adjustment for tuning valve or drive characteristics to system characteristics. This unit is ideally suited for control of flow characteristics of regulating devices.

Standard SAMA signal ranges of 3-15 psig or 3-27 psig.

Relay is direct or reverse acting and suitable for top or bottom connected valves. Six pre-shaped cams are supplied for square root, linear, square, and half-travel regulating characteristics.

Request Product Specification P99-5.

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1041 IVANHOE ROAD CLEVELAND, O.
Bailey Meter Company Ltd., Montreal, Canada

CIRCLE 141 ON READER-SERVICE CARD

Henry Valve Co
Hoke Inc
Keckley Co O C
Kieley & Mueller
Klipfel Valves
Kunkle Valve Co
Leonard Inc Wallace O
Leslie Co
Manning Maxwell & Moore
Marotta Valve
McDonnell & Miller
Milton Roy Co
Mueller Co
Oilgear Co
OPW-Jordan
P K Industries
Petrometer Corp
Pneu-Hydro Valve
Ramo-Wooldridge
Republic Mfg Co
Sprague Engrg
United Aircraft Prods
Vacuum Research
Vickers-A & E Center
Victor Equipment
Vinson Mfg Co

VALVES, Solenoid

Acme Industrial Co
Allenair Corp
Allied Control Co
Altair Inc
Applied Dynamics
Arkwin Industries Inc
Automatic Switch Co
Automatic Valve Co
Carruthers & Fernandez
Clark Controller
Clark-Cooper
Controls Co of Amer
Denison Engrg Div
Detroit Controls
Eclipse Fuel Engrg
Farris Engrg Corp
General Controls
Golden Anderson
Gould Company
Grove Valve & Regulator
Hammel-Dahl Div
Haveg Industries
Hays Mfg Co
Hoke Inc
Humphrey Products Div
Johnson Corp
Keckley Co O C
Koontz-Wagner Elec
Leonard Inc Wallace O
Marotta Valve
Marsh Instr Co
Mercoid Corp
Midwestern Instrs
Model Engrg
Oilgear Co
Norwood Controls
Pneu-Hydro Valve
RKL Valve & Mfg
Simmonds Aerocessories
Skinner Elec Valve
United Aircraft Prods
Valcor Engrg Corp
Veeco Vacuum
Versa Products
Vickers-A & E Center
Vinson Mfg Co
Weston Hydraulics Ltd

VENTURI TUBES

B-I-F Industries
Bailey Meter Co
Bristol Co
Foxboro Company
General Controls
Penn Instruments
Porter Inc Geo K
Robinson Orifice
Simplex Valve & Meter

VIBRATION INSTRUMENTS, Indicators and/or Recorders

Aeronaut & Instr Div
BJ Electronics
Chadwick-Helmuth
Consol Electrodynamics
Engis Equipment
Epic Inc
Erwood Inc
Federal Shock Mount
Flow Corporation
Gaertner Scientific
GE Apparatus Sales Div
General Radio
Geotechnical Corp
Houston Instrument
Impact-O-Graph Corp
Inertia Switch Inc
International Res & Dev
Kahn & Co
Kay Electric Co
Kistler Instrument
Land-Air Inc
MB Electronics
Massa Div
M-H Davies Labs Div
Scott Inc H H
Southwestern Indus Elx
Tel-Instrument Elx
Testing Machines Inc
Westinghouse Electric

VIBRATION PICKUPS

Aeronaut & Instr Div
B & F Instruments
BJ Electronics
Chesapeake Instr
Consol Electrodynamics
Electro Products Labs
Erwood Inc
Federal Shock Mount
Geotechnical Corp
International Res & Dev
Kistler Instrument
Land-Air Inc
MB Electronics
Micrometrical Mfg
General Radio
Schaevitz Engineering

VIBRATION TEST EQUIPMENT, Including Shake Tables

All Amer Tool & Mfg
Ap lied Science Corp
Associated Testing Labs
Baldwin-Lima-Hamilton
Chadwick-Helmuth
Consol Electrodynamics
Consolidated Systems
Gaynes Engineering
Geotechnical Corp
International Res & Dev
Kay Electric Co
MB Electronics
Miller Co L C
Scott Inc H H
Testing Machines Inc
Universal Match
Wyle Mfg Corp

VIBROGRAPHS

Epic Inc
Erwood Inc
Federal Shock Mount
Geotechnical Corp

VIBROMETERS

Epic Inc
Erwood Inc
Federal Shock Mount
Geotechnical Corp
International Res & Dev

VIBROSCOPES

Epic Inc
Bush Associates G F
Federal Shock Mount

VISCOSITY CONTROLLERS, including Consistency

Automation Products
Bendix Cincinnati Div
Brabender Instr C W
Brinkmann & Co C A
Brookfield Engrg Labs
Fischer & Porter Co
Foxboro Company
Hallikainen Instrs
Norcross Corp
Sunshine Scientific

WASTE TREATMENT INSTRUMENTS

B-I-F Industries
Bailey Meter Co.
Beckman/Scl & Proc Div
Bristol Co
Fischer & Porter Co
Foxboro Company
Hagan Chem & Controls
Infilco Inc
Kruger Instrs Harold
Phoenix Precision Instr
Simplex Valve & Meter

WATCH RATE TESTER

WATCHES, Chronometer, including Marine (see also Clocks)

Bulova Research
Ducommun Co M
Greiner Co Emil
Micronics Div

WATCHES, Stop

Ducommun Co M
Greiner Co Emil
Martindale Electric
Pacific Transducer Corp
Racine & Co
Sticht Co Herman
Zernickow Co O

WEIGHING SCALES

Allegany Instrument
American Data Div
American Electronics Inc
Automatic Scale Co
Baldwin-Lima-Hamilton
B-I-F Industries
Bytrex Corp
Chatillon John
Detecto Scales
Dillon & Co W C
Dynametrics Corp.
Emery Co A H
Exact Weight Scale
Fisher Scientific
Greiner Co Emil
Hydroway Scales
Nuclear Materials & Eqpt
Ohaus Scale Corp
Performance Measurements
Revere Corp of Amer
Richardson Scale Co
Streeter Amet
Telechrome Mfg Corp
Thayer Scale Corp
Triner Scale & Mfg
Weighing & Control Comps
Welch Scientific
Westronics Inc

WEIGHT CONTROLLERS, Indicating, Recording

B-I-F Industries
Baldwin-Lima-Hamilton
Barber-Colman
Bytrex Corp
Daytronic Corp
Detecto Scales
Exact Weight Scale
Gilmore Industries
Kieley & Mueller
Monroe Components Div
Richardson Scale Co
Streeter Amet
Weighing & Control Comps
Westronics Inc

MULTI-MINIATURE FEATURES with PACKLESS "DEMI G" VALVES

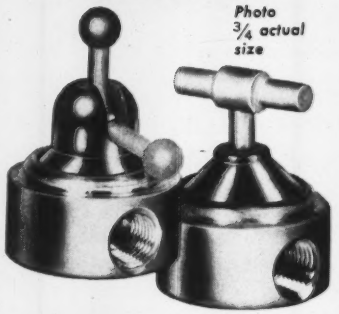


Photo ¾ actual size

"DEMI G" SERIES

Packless "DEMI G" Valves are miniature in size, weight and price. They employ a patented form and give bubble-tight shut-off. They are available in many bar-stock materials with a wide variety of tee-handle and toggle actuators and have innumerable applications in the chemical, oil, instrumentation, aircraft and atomic energy fields . . . to name but a few.

Basic "DEMI G" Valves employ metal-to-metal seating, however TEFLON seats for vacuum service, neoprene diaphragms for toggle actuation and all TEFLON interior models . . . as well as those with bolted bonnets are standardly available. Where space and exacting control are considerations, the "DEMI G" Series of packless valves will do the job better.

PRESSURE RATING Metal Body & Diaphragm Neoprene Diaphragm TEFLON Body & Diaphragm	 750 psi at 450°F 100 psi at 180°F 100 psi at 450°F
MAXIMUM Cv	0.4
CONNECTIONS	1/16" to ½" N.P.T.

Send for the "DEMI" Catalog D-1 and other technical data on Dahl pneumatic and hydraulic valves.

GEORGE W.
DAHL
COMPANY, INC.
86 TUPELO STREET, BRISTOL, RHODE ISLAND

CIRCLE 142 ON READER-SERVICE CARD

CIRCLE 143 ON READER-SERVICE CARD →

controls

for pressure, liquid level, temperature and flow

Mason-Neilan offers one of the widest and most versatile lines of control devices, designed — from primary to final control element — to provide superior performance.

This modern line includes a variety of pneumatic controllers, control valves and auxiliary equipment, all characterized by minimum maintenance requirements and maximum reliability.

For complete catalog data and application engineering assistance call a Mason-Neilan representative or write:

MASON-NEILAN

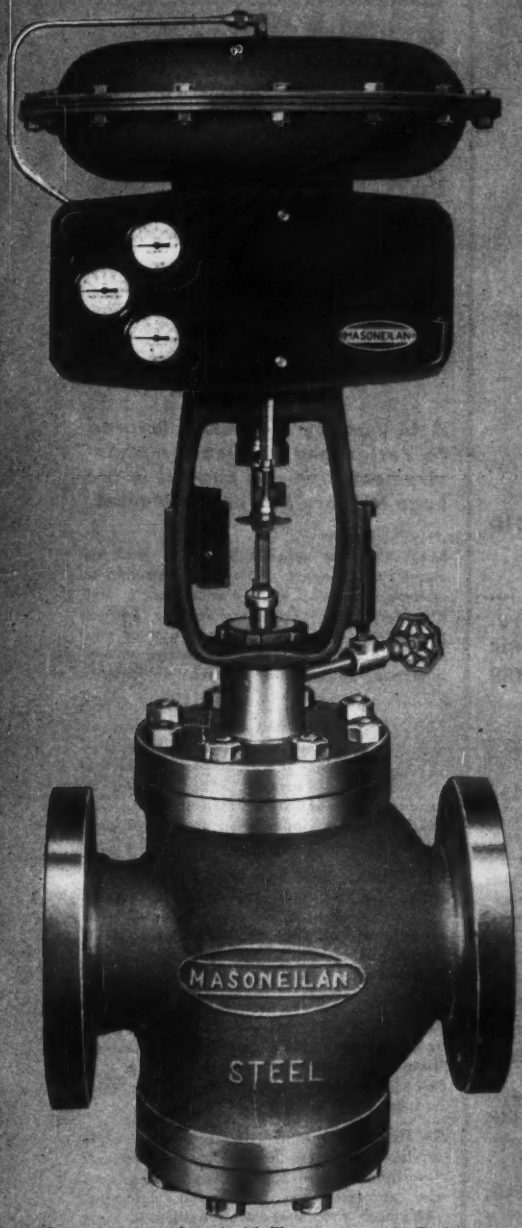
Division of Worthington Corporation

55 NAHATAN STREET, NORWOOD, MASSACHUSETTS, U.S.A.

District offices or Distributors in principal U. S. cities

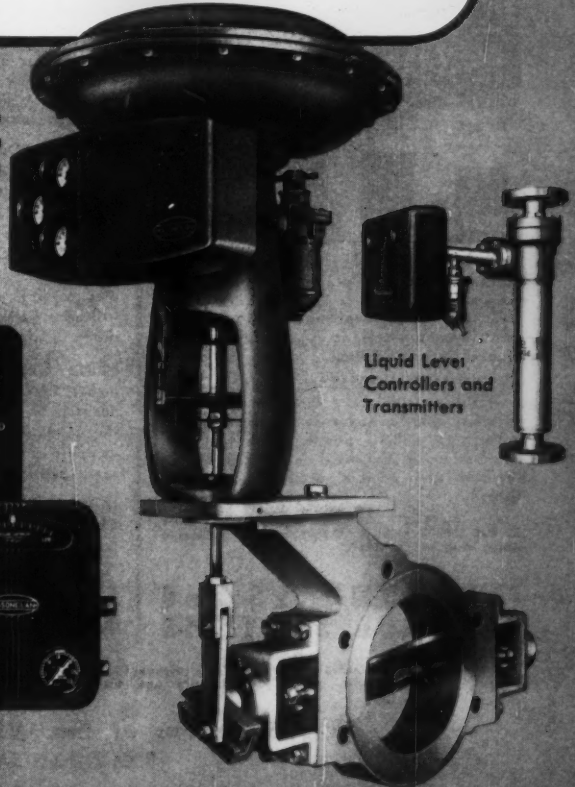
In Canada: Worthington (Canada), Ltd., Mason-Neilan Division

MND-25

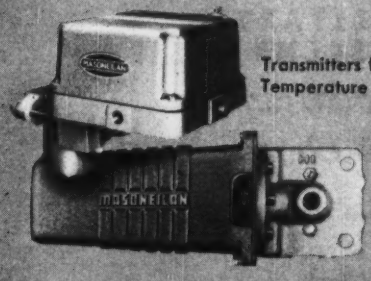


Control Valves shown with Electropneumatic Positioner

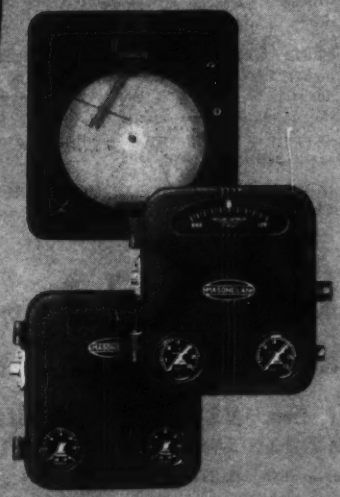
Butterfly Valves shown with Spring-diaphragm Actuator and Pneumatic Positioner



Liquid Level Controllers and Transmitters



Transmitters for Pressure, Temperature or Flow



Pneumatic Control Instruments

PLEASE SPECIFY ITEM OR ITEMS WHICH INTEREST YOU

CIRCULATION NOW

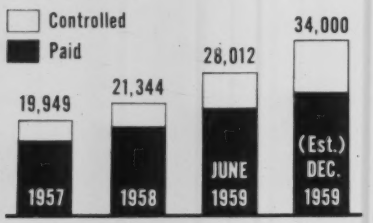
Over 30,000

AND STILL GROWING!

Serves the industrial market for instrumentation and control products.

THE MARKET: As large as industry itself. Dollar sales of instrumentation products bought by all industry is over 4 billion dollars annually. I&CS tailors its appeal to the process, production, research and other industry users.

READERS—CIRCULATION: I&CS serves the men throughout industry whose responsibility is the purchase, specification, installation, maintenance and operation of industrial and scientific instrumentation and control equipment and systems. Circulation now over 30,000.



EDITORIAL QUALITY: Editorial policy has proven logical and practical for 32 years. Object . . . service to industrial instrument users of measurement and control equipment. Major emphasis is on coverage of process instrumentation.

ADVERTISING LEADERSHIP: Substantial advertising gains are a direct indication of editorial quality, advertiser confidence and advertising pulling power. I&CS leads all publications in the field in number of advertisers and number of exclusive advertisers.

1961 'BUYERS' GUIDE: Distribution over 30,000. Published in October 1960. Closing date, August 31, 1960.

INSTRUMENTS and CONTROL SYSTEMS

OVER

90,000

COPIES EVERY OTHER MONTH

THE FIELD'S PRODUCT TABLOID FOR *ALL* INDUSTRY

Read by men concerned with industrial and scientific instruments, apparatus, and electronic and mechanical components, and allied equipment.

READERS . . . over 90,000 copies distributed to customers of equipment and component distributors who pay the publisher for each recipient they provide.

TABLOID FORMAT with 85% of editorial space devoted to staff-written reports on new products and new literature from manufacturers of instruments, scientific apparatus, electronic and mechanical components. The balance is devoted to general coverage of the field, unique applications of principles or devices, calendar of events, staff-written articles on instrument industry trade shows, conferences, etc.

60,000 SALES LEADS per average issue makes IAN top product promoter in the country. Over 40% of the leads come from the advertisements alone. That's why IAN advertising volume so far in 1959 is up over same period in 1958.

LOWEST COST PER THOUSAND READERS . . . as low as $3 per thousand for a tabloid ninth page.

INSTRUMENT & APPARATUS NEWS

Takes your sales message to

33,000 Men

in Government and Industry

A bi-monthly magazine devoted to design and application of instrumentation and control in the huge Military Equipment Market.

MARKET: Now exceeds $4 billion, and includes components, materials, instruments, systems, controls, wire, optical parts and other equipment necessary for the design, production, assembly and operation of military equipment for communication, missile guidance, radar, fire control, navigation, etc.

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EDITORIAL: Each issue carries material of direct interest and immediate usefulness . . . feature articles on new concepts, techniques, data on circuits, application of components, standards, etc., plus regular departments . . . News . . . Trends . . . New Literature, etc.

KING-SIZE FORMAT: Half again as wide as conventional 7x10 page . . . all advertisements appear next to live editorial . . . helps build high readership for your sales message.

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Combination Rates: A 10% discount applies if equivalent space used in two or all three publications. For unduplicated coverage of 150,000 buyers and users in the industrial and military instrument-control market, use all three.

All publications of the INSTRUMENTS PUBLISHING CO., INC.

845 RIDGE AVE., PITTSBURGH 12, PA.

New York, Chicago, Cleveland, Boston, Kansas City, Dallas, Los Angeles, San Francisco, Philadelphia, St. Louis, London, England.

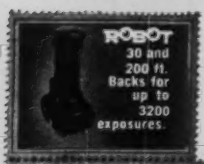
Data Handling

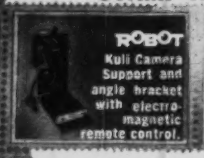
1960 BUYERS' GUIDE 2

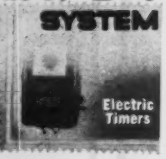
COMPUTERS,
DATA HANDLING,
RECORDING
EQUIPMENT AND
ACCESSORIES

ONE AUTOMATIC CAMERA PLUS... A COMPLETE BLOCK OF ACCESSORIES

ROBOT Royal 36a w/ZEISS Sonnar 50mm f/2







TOPS IN PHOTOGRAPHIC AUTOMATION

ROBOT Royal (with View/RANGEFINDER
ROBOT Recorder (for photo registration only) ... FROM $129.00
(for registration and personal use) ... FROM $159.00

Here's the only *electro-automatic* registration system built around a motor driven 35mm camera that in itself is *fully* automatic.

The basic ROBOT camera takes standard 35mm film and can be ordered in your choice of 24x36mm, 24x24mm or 18x24mm frame sizes.

And you'll find a ROBOT "*Construction-unit*" accessory, designed to adapt the camera to any photographic registration assignment in Science and Industry.

karl heitz Inc.

480 Lexington Ave., New York 17, YUkon 6-4920

CIRCLE 144 ON READER-SERVICE CARD

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Burke & James
Camera Equipt Co
Crum Instrument
DuMont Labs Allen B
Electro-Medical Lab
Electronic Tube
Fairchild Camera & Instr
Fecker Inc
Geotechnical Corp
Gordon Enterprises
Heitz Inc Karl
Hewlett-Packard
Mast Development
Richardson Camera Co
Southwestern Indus Elx
Specialties Inc
Telechrome Mfg Corp
Traid Corp
Vought Company

CAMERAS, Scientific, including Back Reflection
Abrams Instrument
Bausch & Lomb
Bulova Research
Burke & James
Camera Equipt Co
Fecker Inc
Geotechnical Corp
Gordon Enterprises
Heitz Inc Karl
Henson Co Fred C
Instrument Corp of Fla
Jarrell Ash Co
Palos Optical Co
Richardson Camera Co
Sterling Precision
Traid Corp
Zoomar Inc

CAMERAS, Scientific, Motion Picture, including High Speed
Analogue Controls Inc
Burke & James
Camera Equipt Co
Chadwick-Helmuth
DuMont Labs Allen B
Eastman Kodak
Fairchild Camera & Instr
Fecker Inc
Gordon Enterprises
Henson Co Fred C
Instrument Corp of Fla
Lafayette Instr
Librascope Inc
Mast Development
Oltronix Inc
Richardson Camera Co
Sanders Labs
Sterling Precision
Traid Corp
Vought Company

COMPUTERS, Analog, Electronic
Airpax Electronics
Allegany Instrument
American Electronics Inc
Analog Controls Inc
Arma Division
Beckman/Berkeley Div
Bulova Research
Burroughs Corp
Control Technology
Curtiss Wright
Dalmotor Div
Dian Laboratories
DJECO
Donner Scientific
Ebex
Electro-Autosizing
Electrol
Electro-Measurements
Electro Precision
Electronic Associates
Epsco Inc.
Feedback Controls Inc
Foxboro Company
GPE Controls
GPS Instrument
General Controls
GE Computer Dept
Genesys Corp
Gerber Scientific Inst
Giannini Controls Corp
Gulton Industries
Hoover Electronics
IBM Corp
Leeds & Northrup
Librascope Inc
Link Aviation
MacLaren & Co F B
Maxson Corp W L
M-H Aeronautical Div
Missouri Res Labs
Oltronix Inc
Panellit Inc
Philbrick Researches Inc
Precision Mechanisms Corp
Ramo Wooldridge
Rattray & Co Geo
Reeves Instr Corp
Reflectone Corp
Research Inc
Southwestern Indus Elx
Standard Electric Time
Sterling Precision
Swartwout Co
Systron Corp
Tapco Group
Tech Measurement Corp
Telechrome Mfg Corp
Weston Instruments

COMPUTERS, Digital, Electronic, (see also Digital Building Blocks)
Allegany Instrument
American Electronics Inc
Applied Research Labs
Arma Division
Autonetics
Bendix Computer Div
Bowmar Instrument
Bulova Research
Burroughs Corp
CGS Laboratories Inc
Clary Corp
Computer Control
Control Data Corp
Curtiss Wright
Delco Radio
Di/An Controls
Digitronics Corp
DJECO
Ebex
Electrodata Div
Electro-Autosizing
Electronic Computer Co
Ferranti Electric
GE Computer Dept
GPE Controls
General Mills Inc
Genesys Corp
Giannini Controls Corp
Gulton Industries
Hagan Chem & Controls
Hoover Electronics
Hughes Products
IBM Corp
Kearfott Co
Leeds & Northrup
Librascope Inc
Link Aviation
Maxson Corp W L
M-H Aeronautical Div
Monroe Electronics Div
Navigation Computer Corp
Packard Bell
Panellit Inc
Philco Corp
Ramo-Wooldridge
Ransom Research
Royal McBee Corp
Southwestern Indus Elx
Specialties Inc
Systron Corp
Tapco Group
Tech Measurement Corp
Technitrol Engrg
Telechrome Mfg Corp
Thompson-Ramo-Wooldridge
Wang Laboratories
Weston Instruments

COMPUTERS, Mechanical and Electro-Mechanical, including Desk Computing Machines
Allen Business Machines
American Electronics Inc
Bulova Research
Burroughs Corp
Clary Corp
Detecto Scales
Epsco
Friden Inc
GPE Controls
Genesys Corp
Gerber Scientific Inst
Giannini Controls Corp
IBM Corp
Kearfott Co
Librascope Inc
Link Aviation
MacLaren & Co F B
Monroe Electronics Div
North Electric Co
Rattray & Co Geo
Sterling Precision

CONVERTERS, Analog-to-Digital
Adage Inc
Airpax Electronics
American Data Div
American Electronics Inc
American Meter Co
Anadex Instruments Inc
Analogue Controls Inc
Andromeda Inc
Bailey Meter Co
Bendix Cincinnati Div
Burroughs Corp
Chesapeake Instr
Coleman Electronics
Coleman Engrg
Computer Control
Computer Equipment
Computer Measurements
Consol Controls
Consol Electrodynamics
Consolidated Systems
Cox Instruments
Curtiss-Wright IMI
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Detecto Scales
Detroit Controls
Di/An Controls
Digitran Co
Dynamics Research
Dynatronics Inc
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Electro-Autosizing
Electro Instruments
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Gilmore Industries
Gulton Industries
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Hoover Electronics
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Julie Research Labs
Kearfott Co
Librascope Inc
Link Aviation
Milgo Electronic
M-H Aeronautical Div
Model Engrg
Non-Linear Systems
Northeastern Engrg
Norwood Controls
Orbitran Co
Packard Bell
Panellit Inc
Philco Corp
Radiation Instr Dev Lab
Ramo-Wooldridge
Ransom Research
Rattray & Co Geo
Rotary Devices Corp
Southwestern Indus Elx
Sterling Precision
Streeter Amet
Swartwout Co
Systron Corp
Taylor Instrument
Tech Measurement Corp
Telechrome Mfg Corp
Telecomputing Corp
United Engineers Inc
Wang Laboratories
Weston Instruments
Wright Machinery Co

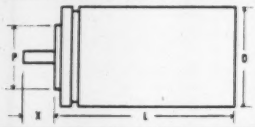
CONVERTERS, Binary-to-Decimal
Adage Inc
Anadex Instruments Inc
Bailey Meter Co
Beckman/Berkeley Div
Burroughs Corp
Coleman Electronics
Computer Control
Computer Equipment
Computer Measurements
Datex Corp
Di/An Controls
Digitran Co
Dymec Inc
Dynatronics Inc
Ebex
Electro Instruments
Electronic Associates
Electronic Computer Co
Engineered Electronics
Epsco Inc
Fischer & Porter Co
Genesys Corp
Gerber Scientific Inst
Gurley W & L E
Haydon Co A W
Hoover Electronics
Julie Research Labs
Kearfott Co
Librascope Inc
Link Aviation
Model Engrg
Navigation Computer Corp
Northeastern Engrg
Norwood Controls
Orbitran Co
Packard Bell
Panellit Inc
Ransom Research
Rotary Devices Corp
Tech Measurement Corp
Wang Laboratories

CONVERTERS, Digital-to-Analog
Adage Inc
Analog Controls Inc
Andromeda Inc

Induction Motors of California Offers Step-Servo Motor Line

A full line of step-servo motors, sizes 5, 8, 11, 15 and 23, designed for digital-to-analog conversion in 45° increments up to 160 pulses per second, are available with impedance of 15 to 320 ohms and voltage range of 20 to 50 VDC and meet environmental requirements of MIL-E-5272B and MIL-E-5400. No mechanical detents are employed.

GENERAL SPECIFICATIONS



I. M. C. P/N	Dim. in Inches D	L	P	X	Rotor Inertia GM-CM²	Min. Holding Torq. Oz.-In.	Max. Watts Per
005-801	.500	1.20	.375	13/32	0.20	0.4	8
9708-024	.750	1.09	.500	11/32	0.65	0.8	10
011-859	1.062	1.36	.625	3/8	0.65	1.4	15
9711-007	1.062	1.76	.625	3/8	2.5	1.4	15
9711-056	1.062	1.78	.625	3/8	2.5	1.2	15
9711-053	1.062	1.36	.625	3/8	2.5	1.0	15
9715-001	1.437	1.75	.875	3/8	2.5	1.8	25
023-801	2.250	1.75	2.00	5/8	5.0	3.0	50

INDUCTION MOTORS OF CALIF. DIV.
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COUNTER—DIVIDER WITH MEMORY

These devices are compact—solid state—magnetic counter dividers. Capable of counting rates to 100,000 PPS. Division up to 16 per stage. Applications include counting, dividing, storage, timing, control and programming. Available as components or systems. Write your requirements to us.

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WORTH 6-0822

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Bailey Meter Co
Beckman/Berkeley Div
Burroughs Corp
Coleman Electronics
Coleman Engrg
Computer Control
Computer Equipment
Curtiss-Wright IMI
Datex Corp
DI/An Controls
Dynatronics Inc
Ebex
Electro Instruments
Electronic Associates
Epsco Inc
Genesys Corp
Gerber Scientific Inst
Gulton Industries
Hagan Chem & Controls
Hewlett-Packard
Hoover Electronics
Julie Research Labs
Kearfott Co
Librascope Inc
Link Aviation
Milgo Electronic
M-H Aeronautical Div
Model Engrg
Navigation Computer Corp
Northeastern Engrg
Packard Bell
Panellit Inc
Philco Corp
Ramo-Wooldridge
Ransom Research
Rotary Devices Corp
Spectrum Instruments
Telechrome Mfg Corp
United Engineers Inc
Wang Laboratories
Waugh Engrg Co
Westinghouse Director Sys

CONVERTERS, Punched Cards

American Data Div
American Electronics Inc
Anadex Instruments Inc
Beckman/Berkeley Div
Burroughs Corp
DI/An Controls
Digitronics Corp
Electro Instrumnts
Fischer & Porter Co
Genesys Corp
Gerber Scientific Inst
Gordon Enterprises
Gulton Industries
IBM Corp
Librascope Inc
M-H Davies Labs Div
Moseley Co F L
Philco Corp
Systematics Inc
Wang Laboratories

CONVERTERS, Punched Tape

American Electronics Inc
Anadex Instruments Inc
Burroughs Corp
CGS Laboratories Inc
DI/An Controls
Digitronics Corp
Electro Instruments
Ferranti Electric
Fischer & Porter Co
Genesys Corp
Gerber Scientific Inst
Gulton Industries
IBM Corp
Librascope Inc
Moseley Co F L
Northeastern Engrg
Philco Corp
Systematics Inc
Wang Laboratories

COUNTERS, Electrical Impulse

Abrams Instrument
American Data Div
Automatic Timing & Contls
Baird-Atomic Inc
Beckman/Berkeley Div
Burroughs Corp
C & K Components
DI/An Controls
Digitran Co
Durant Mfg
Eagle Signal
Electro Precision
Electronic Computer Co
Epic Inc
Erie Pacific
Erie Resistor
Exline Engrg
Fischer & Porter Co
Freed Transformer
General Controls
GE Ordnacy Mfl Elx Dept
Genesys Corp
Gurley W & L E
Haydon Co A W
Hewlett-Packard
Instrument Corp of Fla
IBM Corp
Landis & Gyr
Link Aviation
Monroe Components Div
Navigation Computer Corp
North Electric Co
Northeastern Engrg
Nuclear EL & Corp
Philco Corp
Photocon Research
Presin Co
Ram Meter Inc
Ransom Research
Redford Corp
Richardson Scale Co
Sciaky Bros Inc
Standard Instrument
Stelma Inc
Stewart M C
Systron Corp
Telecomputing Corp
Trott Electronics
Veeder-Root Inc
Wang Laboratories
Walkirt Co

COUNTERS, Photoelectric

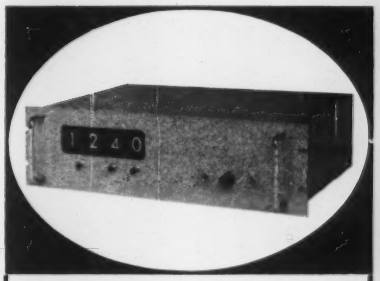
Allied Radio
Appalachian Electronic
Beckman/Berkeley Div
Beva Laboratory
Davenport Mfg
Durant Mfg
Dynapar Corp
Epic Inc
Freed Transformer
General Controls
Gurley W & L E
Hewlett-Packard
Hoffman Electronics
Instr Development Co
Kavamil Co
Machinery Electrification
Navigation Computer Corp
Photobell Co
Post Electronics
Potter Instr Co
Redford Corp
Spectra Electronics
Standard Instrument
Tri-Tronics Co
Trott Electronics
Veeder-Root Inc
Worner Electronic Devices

COUNTERS, Photoelectric, Curve Followers

Geotechnical Corp
Sterling Precision

DATA-PROCESSING SYSTEMS and COMPONENTS, Including Tape Transports, Readers, Loggers, etc. (see also Computers, also Printers)

Airtronics Inc
American Data Div
American Electronics Inc
Anadex Instruments Inc
Arnoux Corp
Atronic Products
B & F Instruments
Bendix Computer Div
Burroughs Corp
Bytrex Corp
CGS Laboratories Inc
Calif Technical Indus
Chrono-Log Corp
Clary Corp
Coleman Engrg
Computer Equipment
Coleman Electronics
Consol Electrodynamics
Consolidated Systems
Control Data Corp
Cox Instruments
Curtiss-Wright IMI
Designers for Industry
DI/An Controls
Digitronics Corp
Dymec Inc
Dynatronics Inc
Ebex
Electric Eye Equip
Electro Instruments
Electrodata Div
Electronic Associates
Electronic Computer Co
Fairchild Camera & Instr
Ferranti Electric
Fischer & Porter Co
Flow Corporation
Friden Inc
General Devices
General Precision Lab
Genesys Corp
Geotechnical Corp
Gerber Scientific Inst
Gilmore Industries
Gordon Enterprises
Gyrex Corp
Hagan Chem & Contrls
Hanson-Gorrill-Brian
Hermes Electronics
Hoover Electronics
Hughes Products
IBM Corp
Kavamil Co
Kearfott Co
Leeds & Northrup
Librascope Inc
Link Aviation
Magnasync Mfg Co
Magnavox Co
Marquardt-Pomona Div
Midwestern Instrs
Milgo Electronic
M-H Davies Labs Div
M-H Missile Equipt Div
Missouri Res Labs
Monroe Components Div
Moore Associates
Non-Linear Systems
North Electric Co
Panellit Inc
Parabam Inc
Philco Corp
Potter Instr Co
Radiaphone Co
Ramo-Wooldridge
Ransom Research
Richardson Camera Co
Sciaky Bros Inc
Southwestern Indus Elx
Specialties Inc
Stromberg-Carlson San Diego
Stromberg Time Corp
Systematics Inc
Systron Corp
Tally Register Corp
Tapco Group
Taylor Instrument
Technitrol Engrg
Telechrome Mfg Corp
Telecomputing Corp
Thompson-Ramo-Wooldridge
Traid Corp



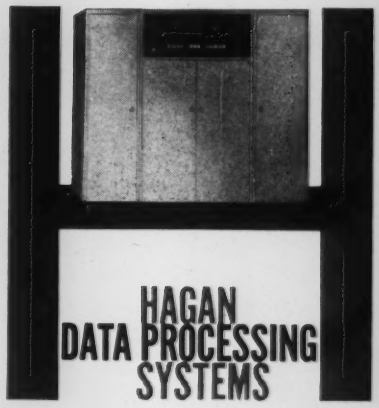
PARABAM DIGITAL CLOCK

EVERY MINUTE, EVERY TENTH-MINUTE OR EVERY SECOND THROUGHOUT THE DAY, PARABAM DIGITAL CLOCKS FURNISH NON-AMBIGUOUS CONTACT CLOSURES. THIS CONTACT OUTPUT MAY BE USED TO PROVIDE A TIME OF DAY READING FOR PROCESS CONTROL SYSTEMS, TEST DATA RECORDING SYSTEMS, COMPUTER SYSTEMS OR OTHER DATA LOGGING AND PROCESSING SYSTEMS. THE CLOCK IS ALSO DESIGNED FOR USE AS A MASTER TIME SOURCE FOR DIGITAL COUNT-DOWN SYSTEMS OR ELAPSED TIME INDICATORS.

STANDARD PARABAM DIGITAL CLOCKS FEATURE SINGLE PLANE IN-LINE LAMP-BANK DISPLAYS, REMOTE INDICATOR ASSEMBLIES, AND PUSH-BUTTON RESET SWITCHES.

PARABAM, INC.
13000 YUKON AVE., HAWTHORNE, CALIF.

CIRCLE 147 ON READER-SERVICE CARD



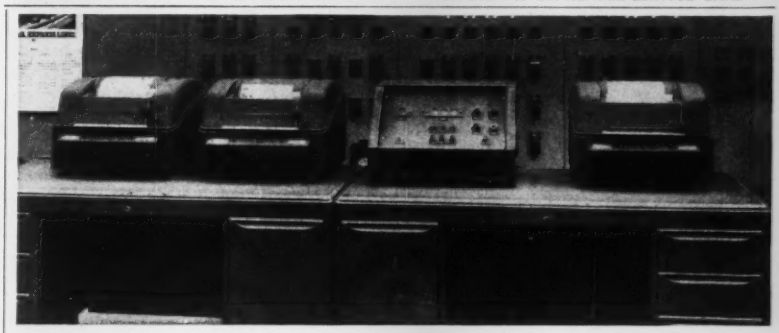
HAGAN DATA PROCESSING SYSTEMS

The Hagan Kybernetes Series 2000 data processing system, utilizing solid state components, has these features:
• *Flexibility*—basic logging unit easily expanded for more complex operations, including off-normal scanning, trend logging, computing or integrating, etc.
• *Modular Construction*—simplifies maintenance and extension of system.
• *Optimum Reliability*—solid state components and simplified, logical design add to life and provide a high degree of dependability.

HAGAN CHEMICALS & CONTROLS, INC.
DIVISIONS: CALGON COMPANY, HALL LABORATORIES

HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Flumendosa No. 13, Milano, Italy

CIRCLE 148 ON READER-SERVICE CARD



Bailey METROTYPE Information Systems

Accurate, dependable Bailey Measuring Instruments and Transducers combine with the latest techniques in data handling to produce an integrated system best suited to your process.

A Bailey METROTYPE Information System rapidly scans hundreds of measurements of temperatures, pressures, flows, etc., sounds an alarm for off-normal values, and reads out any or all data periodically or on demand.

Transmission of both analog signals to, and digital signals from the METROTYPE Information System may be via: high frequency signals (radio, UHF, microwave); direct cable (AC or DC); or long distance lines (telephone, telegraph, carrier currents).

Readout methods from which you may choose include any one or any combination of the following: Printed Log Sheets, Indicator Lights, Punched Tape, Magnetic Tape.

The system utilizes the Bailey Building Block method of construction with functionally designed interchangeable plug-in modules. All inter-unit wiring connections are accessible at rear of cabinet. Where applicable, each module incorporates visual indications of circuit action. A centrally located check point panel is included for all important input, output, and control signals.

Your METROTYPE Information System may be installed in connection with a new, complete measuring and controlling system, or it may be used with existing primary measuring devices.

Request Bulletins E72-1 and E72-2.

BAILEY METER COMPANY
1041 Ivanhoe Road • Cleveland, O.
Bailey Meter Company Limited, Montreal, Canada

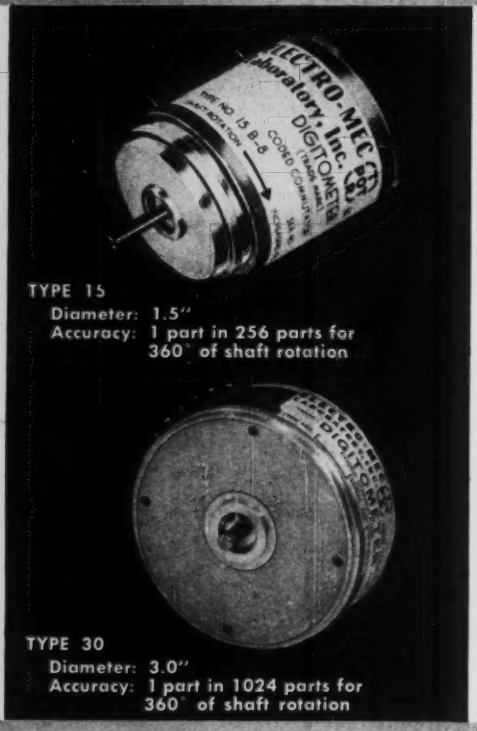
CIRCLE 149 ON READER-SERVICE CARD

ELECTRO-MEC'S *New* DIGITOMETER™

(A Shaft Angle Digitalizer)

SHAFT POSITION TO NUMBERS
for record-indication or for computation.
NOW — A rugged shaft digitalizer
(non-ambiguous)
for AIRBORNE ENVIRONMENTS

NO GEARS • NO BACKLASH



TYPE 15
Diameter: 1.5"
Accuracy: 1 part in 256 parts for 360° of shaft rotation

TYPE 30
Diameter: 3.0"
Accuracy: 1 part in 1024 parts for 360° of shaft rotation

NO NON-AMBIGUITY NETWORKS

The system designer doing digital servo work recognizes the benefits of ELECTRO-MEC DIGITOMETERS because

1. Shaft position to electrical contact closures
2. No ambiguity (Gray Code)
3. Low shaft torque requirements
4. High slewing speed (650 rpm)
5. Small size
6. Lightweight
7. Designed to withstand the rigors of MIL (E) 5272 environmental test specification.

ELECTRO-MEC Laboratory, Inc.
47-51 33 Street, Long Island City 1, N. Y.

For data sheets or further information write to our Engineering Dept.

CIRCLE 150 ON READER-SERVICE CARD

TWIN LAMP ASSEMBLY No. 248-6939-1437

Replaceable Lamp Cartridges

SINGLE LAMP HOLDER No. 7538

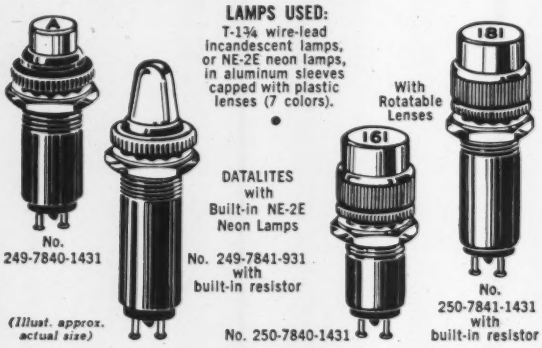
In this brochure—complete facts on DIALCO's

DATALITES®

For the Computer-Automation Industries

DATALITES by DIALCO are ultra-miniature Indicator Lights specially designed to meet the critical requirements of the computer-automation fields. Made in 2 basic styles: *Lamp Holders with* DIALCO'S own *replaceable Lamp Cartridges* (see above); or integrated DATALITES *with Built-in Neon Lamps* which are *not replaceable* (see below). Ultra-compact, single units mount in ⅜" clearance hole; the twin-lamp assembly mounts in ¾" clearance hole.

LAMPS USED:
T-1¾ wire-lead incandescent lamps, or NE-2E neon lamps, in aluminum sleeves capped with plastic lenses (7 colors).



No. 249-7840-1431

DATALITES with Built-in NE-2E Neon Lamps

No. 249-7841-931 with built-in resistor

With Rotatable Lenses

No. 250-7840-1431

No. 250-7841-1431 with built-in resistor

(Illust. approx. actual size)

DATALITES have fully insulated terminals and conform to all applicable military specifications. Integrated units are available *with or without built-in resistors.* The cylindrical lenses can be hot-stamped with digits, letters, etc. Complete details in *Brochure L-160.* Send for it now.

SAMPLES ON REQUEST—AT ONCE—NO CHARGE

Foremost Manufacturer of Pilot Lights

DIALIGHT
CORPORATION

42 STEWART AVE., BROOKLYN 37, N. Y. • HYacinth 7-7600

CIRCLE 151 ON READER-SERVICE CARD

Union Switch & Signal
Vanguard Instrument
Wang Laboratories
Weston Instruments
Westronics Inc

DIGITAL BUILDING BLOCKS, including Computer Components

Airtronics Inc
Anadex Instruments Inc
American Electronics Inc
Beckman/Berkeley Div
Burroughs Corp
Burroughs Elx Tube
Bytrex Corp
Chrono-Log Corp
C & K Components
Clary Corp
Coleman Electronics
Computer Control
Computer Equipment
Consol Electrodynamics
Consolidated Systems
Cooper Development
Curtiss-Wright IMI
Dalmotor Div
Datex Corp
Di/An Controls
Digitronics Corp
DJECO
Dymec Inc
Dynatronics Inc
Electro Precision
Electrodata Div
Engineered Electronics
Engis Equipment
Epsco Inc
GPE Controls
GE Heavy Mil Elx Dept
General Mills Inc
Genesys Corp
Gulton Industries
Hagan Chem & Contrls
Harvey-Wells
Hoover Electronics
Kavamil Co
Kearfott Co
Leeds & Northrup
Librascope Inc
Link Aviation
MacLaren & Co F B
Marquardt-Pomona Div
Milgo Electronic
Monroe Electronics Div
Navigation Computer Corp
North Electric Co
Packard Bell
Parabam Inc
Ransom Research
Rixon Electronics
Systron Corp
Traid Corp
Walkirt Co
Wang Laboratories

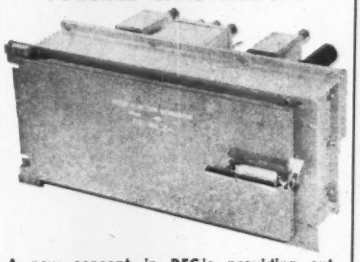
DIGITAL READOUT INDICATORS (see also Data Processing)

Airpax Electronics
American Electronics Inc
Anadex Instruments Inc
BJ Electronics
Beckman/Berkeley Div
Borg Equipment Div
Bowmar Instrument
Burroughs Corp
Burroughs Elx Tube
Bytrex Corp
Consol Electrodynamics
Consolidated Systems
Cox Instruments
Detroit Controls
Dialight Corp
Digitran Co
Durant Mfg
Dymec Inc
Dynamics Research
Dynapar Corp
Electro Instruments
Electrodata Div
Electronic Associates
Electrosnap
Engineered Electronics
Engis Equipment
Erie Pacific
Fischer & Porter Co
General Controls
General Railway Signal
Genesys Corp
Gerber Scientific Inst
Gilmore Industries
Gulton Industries
Hagan Chem & Controls
Haydon Co A W
Hughes Products
Kay Electric
Laboratory for Electronics
Landis & Gyr
Librascope Inc
Link Aviation
Marquardt-Pomona Div
Mast Development
Milgo Electronic
Milman Engrg Co
Navigation Computer Corp
Non-Linear Systems
North Atlantic Indus
Northeastern Engrg
Radio Frequency Labs
Slocomb Co J T
Sterling Precision
Stromberg-Carlson San Diego
Systron Corp
Tech Measurment Corp
Telechrome Mfg Corp
Union Switch & Signal
United Engineers Inc
Westronics Inc

MEMORIES, Electrostatic, including C-R Tubes (see also Computers)

Burroughs Corp
Datex Corp
Electronic Tube
Hughes Products
IBM Corp

DIODE FUNCTION GENERATOR
featuring a
PUNCHED CARD MEMORY

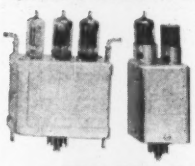


A new concept in DFG's providing outstanding performance & convenience

0.10 % Card Programming Accuracy
0.02 % Long Term Repeatibility
20 Segments & Zero Offset
10 KC Band Width
10 v/v Slope Change/Breakpoint

Increases computation capacity & lowers operating costs through function programming in seconds, eliminating idle computer time & providing a permanent library of functions.

ANALOG COMPUTER AMPLIFIERS



40,000,000 gain
0.1mv stability
± 100v output
Convenient plug-in case. Rugged & shielded

LOW COST

ELECTROL, Inc.
ELECTRONIC CONTROLS & COMPUTERS
9000 W. Pico Blvd. Los Angeles 35, Calif.

CIRCLE 152 ON READER-SERVICE CARD

New UNION readout instruments withstand shock, vibration and extreme temperature changes

Union Switch & Signal's new READALL* readout instrument replaces complicated systems of lights and relays for reading, storing or transferring all types of information for industrial and military applications. It is not to be confused with conventional indicating devices.

Designed to meet requirements of MIL-E-5422D. The new READALL readout instrument is precision-built and provides instantaneous and continuous operation under conditions of shock, vibration and extreme ranges in temperature. The digital display includes characters in numerical sequence from 0 to 9 plus two blank spaces. $\frac{7}{32}$-inch characters can be illuminated red or white as desired; when not illuminated, they appear white against a black background.

Reliability. Performance through one million random operations is an inherent feature of the new READALL instrument. Each module is gasket-sealed in its case to exclude moisture and seal out foreign particles. An especially thin enclosed DC motor, containing ball bearings, permits more efficient operation.

Modular Construction. A unique feature of the readout instrument is its modular construction. It can be used individually or in groups to display multiple characters in a single case.

Direct Code Translation. The operation of the READALL readout instrument is based on a positioning system using a four-bit code. The visual display is the result of a direct electro-mechanical conversion of a binary signal to a decimal read-out. There is no need for additional conversion equipment. Separate code and motor circuits permit the use of the readout instrument in low-level circuitry.

Electrical and Visual Data Storage. Once positioned, the information is displayed until a new code is transmitted to the instrument. No power is consumed while the information is retained. This data may be stored or read-out electrically for further transmission or recording.

Operate Time. The operate time varies from 0.1 second to 1.0 second depending on character position.

Weight and Size. Maximum weight including case is seven ounces; without case, four and one-half ounces. Size encased is $5\frac{13}{64}$ inches long, $1\frac{47}{64}$ inches high and $\frac{39}{64}$ inch wide. The new READALL instrument is designed for operation over a temperature range of −54°C to +71°C in humidities up to 100% and altitudes up to 70,000 feet. For more information, write for Bulletin 1019.

*Trademark

"Pioneers in Push-Button Science"

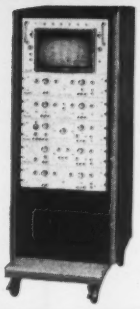
UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
PITTSBURGH 18, PENNSYLVANIA

CIRCLE 153 ON READER-SERVICE CARD

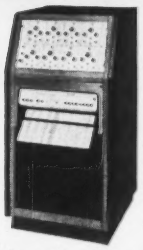
brush ULTRALINEAR RECORDING SYSTEMS

Whatever you want to measure, only Brush gives you freedom of choice: ink, electric or thermal writing—curvilinear or rectilinear trace presentation—configuration. Available in 2, 4, 6 or 8 channels.

2 channel carrier multi-purpose, accepts either resistive or inductive inputs.



6 channel high gain records signals as low as 10 microvolts.



8 channel medium gain wide input range, 10 millivolts to 400v.

Select your OSCILLOGRAPHS

Frequency response . . . D.C. to 100 cps with Brush amplifiers.

Writing methods . . . . Ink, electric curvilinear, or thermal rectilinear.

Chart speeds . . . . . Instantaneous electric selection of up to 16 speeds, remote or on-the-spot control.

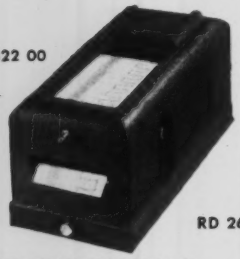
Chart take-up . . . . . External or internal, easy loading.

Mounting . . . . . Rack-mounted, cart-mounted, portable and bench-top models.

Reliability . . . . . Readily adaptable to MIL specifications.

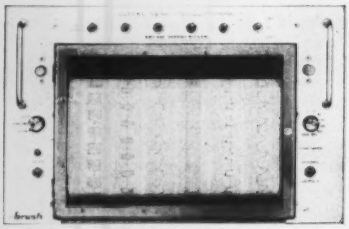
ENCLOSURES	CHANNELS	WRITING METHOD & WRITING PLANE	MODEL NO.
PORTABLES	2	ink, horizontal	RD 2321 00
	2	ink-electric, horizontal	RD 2322 00
	4	ink, horizontal	RD 2341 00
	4	ink-electric, horizontal	RD 2342 00
	6	ink, horizontal	RD 2361 00
	6	ink-electric, horizontal	RD 2362 00
RACK, CONSOLE CABINET OR CART MOUNTED	2	ink-electric, vertical	RD 2622 00
	2	ink-electric, horizontal	RD 2722 00
	4	ink, vertical	RD 2641 00
	4	ink-electric, vertical	RD 2642 00
	4	thermal, vertical	RD 2644 00
	6	ink, vertical	RD 2661 00
	6	ink-electric, vertical	RD 2662 00
	6	thermal, vertical	RD 2664 00
	6	thermal, horizontal	RD 2664 50
	8	ink-electric, vertical	RD 2682 00
	8	thermal, horizontal	RD 2684 50
CART AND BENCH TOP	6	thermal, horizontal	RD 2784 00
	8	thermal, horizontal	RD 2784 00

RD 2322 00



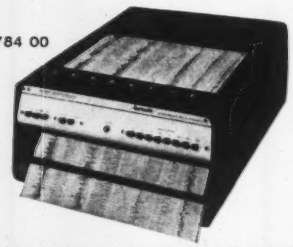
RD 2662 00

PORTABLE OSCILLOGRAPHS in 2, 4 and 6 channels



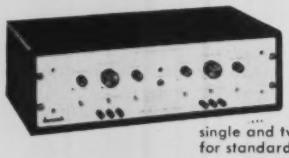
RACK MOUNTING OSCILLOGRAPHS in 2, 4, 6 and 8 channels

RD 2784 00



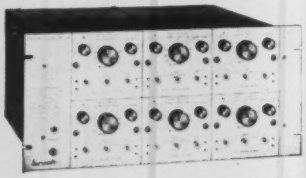
CART OR BENCH TOP OSCILLOGRAPHS in 6 or 8 channels

Select your AMPLIFIERS



single and two channel configuration for standard 19" rack mounting.

six and eight channel configuration for standard 19" rack.



		SINGLE CHANNEL	
UNIVERSAL Model RD 5612 00		multi-purpose carrier type for wide range of measurements. Input box RA 5212 00 for resistive transducers, RA 5222 00 for LVDT's.	
HIGH GAIN D.C. Model RD 5615 10 Model RD 5615 00		amplifies signals as low as 10 microvolts. chopper stabilized, amplifies signals as low as 100 microvolts.	
SERVO ANALYZER Model RD 5616 00		monitors any servo system in carrier frequency range of 50 to 10,000 cps.	
MEDIUM GAIN		TWO CHANNEL	
Model No.	Sensitivity	Drift	Power Line Frequency
RD 5621 00	10 mv/line (mm)	less than ½ line (mm) per hr., 1 line 8 hrs.	60 cps, ± ½ cps
RD 5621 01	10 mv/line (mm)	less than ½ line (mm) per hr., 1 line 8 hrs.	50-2000 cps
RD 5621 02	50 mv/line (mm)	less than 1/10 line (mm) per hr., ¼ line 8 hrs.	50-2000 cps
MEDIUM GAIN		SIX AND EIGHT CHANNEL	
Basic Pen Drive Amplifier System Model RA 5680 00 includes chassis and separate electronic regulated power supply with capacity to operate up to 8 plug-in pen drive amplifiers.			
Plug-in Model RD 5211 03		sensitivity 10 mv/line (mm), less than ½ line (mm) per hr. drift, 1 line 8 hrs., power req. 50-2000 cps.	
Plug-in Model RD 5211 04		sensitivity 50 mv/line (mm), less than 1/10 line (mm) per hr. drift, ¼ line 8 hrs., power req. 50-2000 cps.	

CIRCLE 160 ON READER-SERVICE CARD

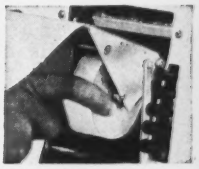
brush ULTRALINEAR RECORDING SYSTEMS

MARK II RECORDER

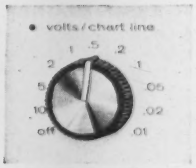
Completely self-contained recorder, plugs in anywhere for easy recording of electrical and physical phenomena, d.c. to 100 cps . . . in research . . . design and development . . . production . . . servicing . . . field test and installation.

RD 2521 00

Sensitivity . . . . . 10 mv/line (mm). Full scale deflection from chart center ± 200 mv.
Measurement range . . .010v. to 400v.
Input impedance . . . . 5 megohm single-ended, 10 megohm balanced.
Event channels . . . . 2, 12v. internal power source actuated by external signal.
Chart speeds . . . . . 1, 5, 25, 125 mm/sec.
Power requirements . . 105-125v., 60 cps, 135 watts at 115v.
Net weight . . . . . 32 pounds.



Convenient operation: fast paper loading without threading, pushbutton controls for 4 chart speeds.



Complete recorder with built-in, permanently calibrated amplifiers.

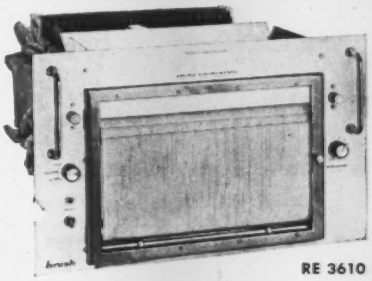
Trouble-free writing system features self-cleaning, self-priming, rugged pens, extra-large ink reservoir.

OPERATIONS MONITOR

Simplifies complex checkouts . . . monitors 100 channels of data simultaneously.

Simultaneously records 100 channels of sequential or operational information. On-off input data presented provides a record of events, their duration, and their time relationship to each other. Electric writing styli record in less than one millisecond after receiving a signal—handle up to 500 signal changes per second. Remote or on-site chart speed control.

Available in two models, the RE 3610 00 or: Military Model RE 3610 02 which fully complies with MIL-E-4158 A.

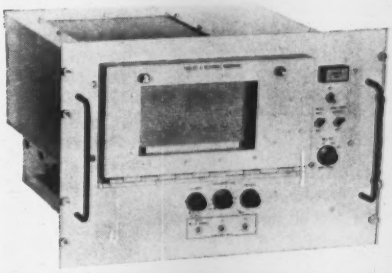


RE 3610 00

Writing method . . . Electric—instantaneous, dry and permanent.
Capacity . . . . . 100 easy-to-identify channels. Records on preprinted chart paper, 12" wide, 500' long.
Chart speeds . . . . Instantaneous electric selection of 8 chart speeds, on-site or remote control.
Chart take-up . . . . Provision for both internal chart take-up of entire roll, or external feed.
Mounting . . . . . Mounts in standard 19" rack.

MILITARIZED
RECORDING SYSTEMS

Fully militarized versions of all equipment are available. Illustrated is the combination Analog and Operations Recorder providing simultaneous analog recording (D. C. to 100 cps) and ten "go and no go" sequential channels. Recording system is complete with oscillograph, amplifier and power supply. Equipment designed to comply with Mil. E-1640 Mil. E-4158, E-4970 and other pertinent specifications as required by user.

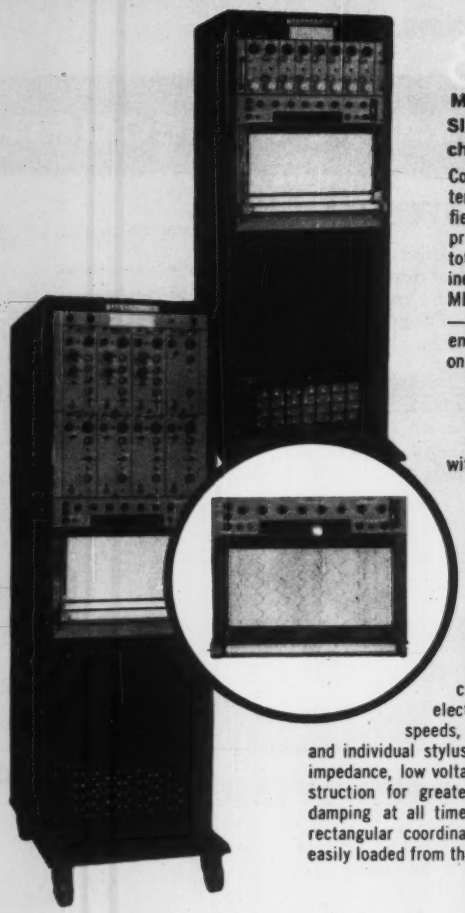


WRITE FOR LITERATURE OR, FOR APPLICATION ASSISTANCE, CONTACT YOUR BRUSH FACTORY BRANCH OR REPRESENTATIVE.

Factory branches, service and warehousing at Arlington, Va., Boston, Cleveland, Los Angeles, San Francisco and Seattle; engineering representatives in all key locations.

brush INSTRUMENTS
DIVISION OF
37th & PERKINS CLEVITE CORPORATION CLEVELAND 14, OHIO

CIRCLE 160 ON READER-SERVICE CARD



MAXIMUM PERFORMANCE VERSATILITY — 6 or 8 channels, DC to 150 cps

Linearity 0.5%, 3 db down at 150 cps (10 div peak-to-peak amplitude). Improved current feedback power amplifiers, negligible drift. Total panel space only 38½". Efficient ducted air system assures constant, adequate cooling of all circuits for reliable operation.

VERSATILE "350" SERIES PREAMPS — compact (10½" high) interchangeable units with highly developed circuitry; for use in "350" systems, or individually (see "450" unit Amplifiers) with its own power supply to drive optical recorders, tape recorders, 'scopes, meters, etc. Available types include

- Carrier
- DC Coupling
- Phase Sensitive Demodulator
- True Differential Wide Band DC (4 models)
- Basic Chopper

with others in development

MINIMUM PANEL SPACE, SIMPLER PREAMPS — 6 or 8 channels, DC to 150 cps

Comparable performance to "350" System; uses same Recorder-Power Amplifier unit. Modules of up to 8 plug-in preamps occupy 7" of panel space; total panel space only 28" (max.); cabinet 60" high.

MINIATURIZED "850" SERIES PREAMPS — simplified, economical plug-in front ends for "850" systems; panel area only 2 1/16" x 7". Types include

- Carrier (separate MOPA required)
- Phase Sensitive Demodulator
- DC Coupling
- Basic Chopper (MOPA required)

with others in development

BASIC "350"/"850" 6- and 8-CHANNEL RECORDER-AMPLIFIER UNITS

6- or 8-channel recorder with transistorized, current feedback Power Amplifiers and voltage regulated power supply. Sensitivity 0.1 volt/chart div; panel space 17½"; nine electrically controlled pushbutton chart speeds, or remote control; automatic over-all and individual stylus heat control; time-code marker; low impedance, low voltage galvanometers with enclosed construction for greater reliability; true velocity feedback damping at all times, limiting ahead of output. Inkless, rectangular coordinate recording on Permapaper charts, easily loaded from the front.

VERSATILE, RELIABLE RECORDING INSTRUMENTATION FROM SANBORN

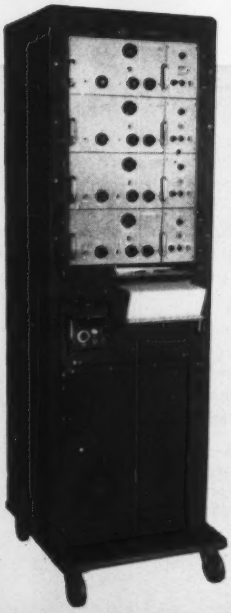
VERSATILE, ECONOMICAL — 1 to 8 channels DC to 100 cps

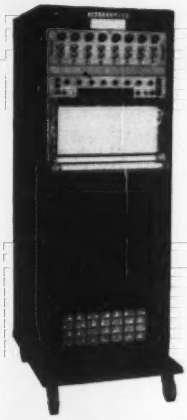
Twelve front ends cover the widest variety of applications. Frequency response 2 db down at 100 cps; over-all linearity better than 1%; basic sensitivity from 10 μv/div to 0.1 volt/div, depending on preamplifier. Current feedback driver amplifier and regulated power supply for each channel; amplifiers, recorder available in individual portable cases.

1- to 8-CHANNEL "150" SERIES RECORDERS Nine chart speeds (multi-channel types), shifted mechanically; automatic over-all and individual stylus heat control; recorder assembly slides out for easy paper loading, better view of recording and marking notations on record; time-code marker; paper take-up; inkless, rectangular coordinate recording on Permapaper charts.

FAMILIAR "150" SYSTEM FRONT ENDS — feature wide choice of types, plug-in design; all have attenuator ratios of 1, 2, 5, 10 . . . to 1000, many have calibrated zero suppression.

- AC-DC
- Carrier
- Servo Monitor (phase-sensitive demodulator)
- DC Coupling
- Log-Audio
- Low Level
- Stabilized DC
- AC Wattmeter
- RMS Volt/Ammeter
- 400 Cycle Frequency Deviation
- Frequency Meter
- Triplexer 3-channel electronic switch

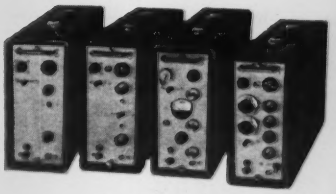




when preamplification is not needed —

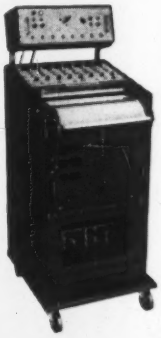
SIMPLIFIED 6- or 8-CHANNEL SYSTEM — 5 volts full-scale

Model 358-5480 system for computer readout, telemetry recording, DC voltage monitoring and similar applications requiring no preamplification. Control panel provides position, smooth gain and attenuation controls, and internal calibration signal. Sensitivity 0.1 volt/div; linearity 0.5% of full scale, gain stability better than 1%; current feedback amplifiers, velocity feedback damping; 9 electrically controlled chart speeds and all other "350" Recorder features.



SELF-CONTAINED "450" UNIT AMPLIFIERS with power supply

Versatile "350" Series preamplifiers with individual power supplies in portable cases; for driving 'scopes, optical oscillographs, tape recorders, etc. Available in "450" cases or four-unit modules in 19" frame for rack mounting. One "450" case and power supply can serve any "350" preamp.



"150" SYSTEM AND PROGRAMMER FOR COMPUTER READOUT

6- or 8-channel consoles in 46½" high mobile cabinet. Dual-Channel DC Amplifiers have sensitivities from 0.01 to 10 volts/div; internal calibration 2 volts ±1%; frequency response flat to 20 cps down 3 db at 50 cycles. Optional Programmer sequences system operation in 20 steps including recorder turn-on, calibration, computer DC level reading, recording for pre-set time, turn-off and reset.

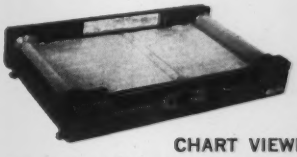
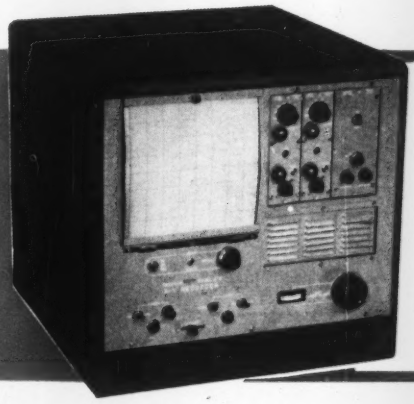


CHART VIEWER for easier editing and study

Permits convenient viewing and interpretation of Sanborn and other strip charts up to 200 ft. long and 16" wide, at continuously variable speeds from ¾" to 7½" per second. Single control for direction and paper speed. Viewing table 18½" x 24".



HIGH SPEED OPTICAL X-Y RECORDER — flat response to 100 cps, writing speeds to 2500"/sec.

Can record such rapidly changing variables as acceleration and vibration of mechanical elements, transistor characteristics, etc. Mirror-galvanometers and a light beam produce recording traces on ultraviolet-sensitive 8" x 8" direct-print paper that develops immediately by exposure to normal room light. Interchangeable "850" system preamplifiers are used for each axis; new preamps and time base generator now in development allow a wide variety of applications.

LINEAR MOTION TRANSDUCERS

. . . to measure displacement

PROBE STYLE — complete, ready to connect to 150, 350 or 850 Series Carrier Amplifiers; uses differential transformer. High sensitivity, unlimited resolution, linearity 0.5%; stroke range ±0.050", sensitivity 50 chart div deflection/0.001" displacement. Model 580 for flange mounting has plug-in cable, Model 581 for screw mounting has integral cable.

LINEARSYN — differential transformer; error due to non-linearity less than 1% of full scale; unlimited resolution. High shock, vibration resistance; hermetically sealed, immersible. Strokes from ±0.005" to ±10.000"; high sensitivities. Six Standard series (three shielded, three unshielded), five models in each series.

. . . to measure velocity

LVsyn — accurate, stable calibration; unlimited resolution. Single-ended or push-pull output. Strokes to 9"; output sensitivities from 35 to 650 mv/inch/sec. Twelve standard Models, with regular or unbreakable cores.

CIRCLE 157 ON READER-SERVICE CARD

Other Sanborn precision instruments include . . .

Individual Recording Galvanometers, Power Amplifiers, Recording Assemblies . . . Servo Monitor Phase Shifters . . . Event Recorders, 4 to 32 channels . . . Monitor Meter . . . Wide Band Driver Amplifier . . . Master Slave Control . . . Pressure Transducers.

For complete descriptive information and specifications, write to the Industrial Division in Waltham or contact your local Sanborn Sales-Engineering representative.

SANBORN COMPANY

INDUSTRIAL DIVISION
175 Wyman Street, Waltham 54, Mass.

MAGNETIC RECORDING HEADS

- DIRECT
- FM
- Pulse Width
- Flux Sensitive (Magnetometer Type) Playback Heads

Custom designed recording heads built to customer specifications.

Complete Integral Head Banks—designed for versatility, accuracy and ease of maintenance.

NO QUANTITY TOO SMALL

HOUSTON
MAGNETIC PRODUCTS, INC.
A subsidiary of houston instrument

CIRCLE 154 ON READER-SERVICE CARD

Intercontinental Elx
Sterling Precision

MEMORIES, Magnetic, including Tape, Drum, Cores (see also Computers)
Adage Inc
Airtronics Inc
Anadex Instruments Inc
Analogue Controls Inc
Andersen Labs
BJ Electronics
Bryant Computer
Burroughs Corp
Computer Control
Computer Equipment
Consol Electrodynamics
Consolidated Systems
Di/An Controls
Electrodata Div
Erie Resistor
Fairchild Camera & Instr.
Ferranti Electric
GE Heavy Mil Elx Dept
General Mills Inc
General Railway Signal
General Time Central
Genesys Corp
Hughes Products
IBM Corp
Kearfott Co
Laboratory for Electronics
Leach Corporation
Librascope Inc
Midwestern Instrs
M-H Davies Labs Div
Minnesota Mining & Mfg
Monroe Electronics Div
North Electric Co
Packard Bell
Philco Corp
Reeves Soundcraft
Rese Engrg Inc
Rixon Electronics
Wang Laboratories

PRINTERS, Numerical Data, including Data Loggers, High Speed Printers, Typewriters, etc. (see also Data Processing)
American Data Div
American Electronics Inc
BJ Electronics
Beckman/Berkeley Div
Burroughs Corp
Chrono-Log Corp
Clary Corp
Computer Measurements
Datex Corp
Dynatronics Inc
Editape Co
Electrodata Div
Electronic Associates
Epsco Inc
Exline Engrg
Fischer & Porter Co
Friden Inc
Gerber Scientific Inst
Hanson-Gorrill-Brian
Hewlett-Packard
IBM Corp
Instrument Corp of Fla
Landis & Gyr
Monroe Components Div
Marquardt-Pomona Div
Northeastern Engrg
Philco Corp
Potter Instr Co
Presin Co
Standard Instrument
Streeter Amet
Stromberg-Carlson San Diego
Stromberg-Carlson Co
Technitrol Engrg
Telechrome Mfg Corp
Telecomputing Corp
Thompson-Ramo
Wang Laboratories

RECORDERS, Circular Chart (see also Object of Measurement)
Aeronaut & Instr Div
Automatic Timing & Contls
Bailey Meter Co
Barber-Colman
B-I-F Industries
Bristol Co
Defender Instrument
Electric Auto-Lite
Engler Instr
Fischer & Porter Co
Foxboro Company
Gerber Scientific Inst
Gilmore Industries
Hagan Chem & Contrls
Hays Corporation
Industrial Instr Corp
InstruLab Inc
Leeds & Northrup
Mason Neilan
M-H Brown Instrs Div
Powers Regulator
Research Inc
Schaevitz Engineering
Taylor Instrument
Weksler Instruments
Westinghouse Electric
Weston Instruments

RECORDERS, Electrosensitive
Century Elx & Instrs
Electro-Autosizing
Larson Instrument
Massa Div
Midwestern Instrs
Westronics Inc

RECORDERS, Magnetic Tape
American Electronics Inc
Ampex Corp
BJ Electronics
Bendix Computer Div
Camera Equipt Co
Consol Electrodynamics
Crump Instrument
Electronic Associates
Epsco Inc
Genesys Corp
Geotechnical Corp
Gordon Enterprises
Gulton Industries
Hermes Electronics
Houston Magnetic Prod's
Instrument Corp of Fla
Leach Corporation
Magnasync Mfg Co
Micronics Div
Midwestern Instrs
M-H Davies Labs Div
Packard Bell
Potter Instr Co
Radiaphone Co
Ramo-Wooldridge
Southwestern Indus Elx
Technitrol Engrg

RECORDERS, Multipoint
Atkins Technical Inc
Barber-Colman
Bristol Co
Consol Electrodynamics
Electro-Autosizing
Electro Instruments
Foxboro Company
GE Apparatus Sales Div
Gilmore Industries
InstruLab, Inc.
Offner Electronics Inc
Larson Instrument
M-H Brown Instrs Div
Research Appliance Co
Schaevitz Engineering
Taylor Instrument
Weston Instruments
Westronics Inc

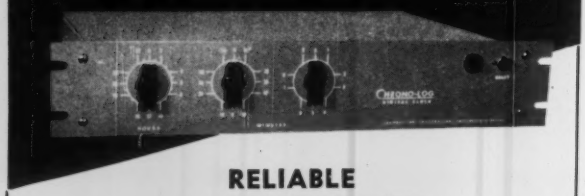
RECORDERS, Strip Chart (see also the Object of Measurement)
Atkins Technical Inc
Automatic Timing & Contls
Barber-Colman
Bristol Co
Brush Instruments Div
Century Elx & Instrs
Consol Electrodynamics
Curtiss Wright
Electro-Autosizing
Electronic Associates
Esterline Angus
Fischer & Porter Co
Foxboro Company
GE Apparatus Sales Div
Geotechnical Corp
Gerber Scientific Inst
Gilmore Industries
InstruLab, Inc.
Larson Instrument
Leeds & Northrup
Link Aviation
Manning Maxwell & Moore
Massa Div
Midwestern Instrs
M-H Brown Instrs Div
Moore Products Co
Moseley Co F L
Norwood Controls
Offner Electronics Inc
Research Inc
Rust Industrial Co
Ryan Recording Thermom.
Sanborn Company
Schaevitz Engineering
Smith Inc Arthur F
Standard Instrument
Swartwout Co
Systron Corp
Taylor Instrument
Texas Instruments Inc
Varian Associates
West Instrument
Westinghouse Electric
Weston Instruments
Westronics Inc

RECORDING HEADS
Ampex Corp
BJ Electronics
Crump Instrument
Genesys Corp
Houston Magnetic Prods
Librascope Inc
Magnasync Mfg Co
Micronics Div
Midwestern Instrs
M-H Davies Labs Div
Monroe Electronics Div
Robins Industries
Southwestern Indus Elx

TAPE, Magnetic Recording
Accurate Specialties
Ampex Corp
Audio Devices
Minnesota Mining & Mfg

TELEGRAPHY, Automatic, including Reperforators, Tape Transmitters, Teleprinters, Teletypers
CGS Laboratories Inc
Editape Co
Ferranti Electric
P and H Electronics
Stelma Inc
Stromberg-Carlson San Diego
Telechrome Mfg Corp
Teletype Corp
Western Apparatus Co

CHRONO-LOG
DIGITAL CLOCK



RELIABLE
FIELD-PROVEN
SMALL SIZE
LOW COST

Time resolutions of minutes, tenths of minutes or seconds.

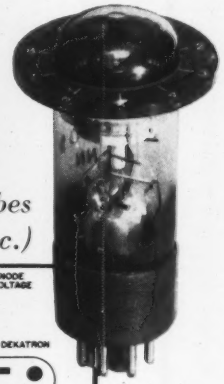
Available with one parallel, binary-coded-decimal electrical output or up to three parallel, decimal electrical outputs.

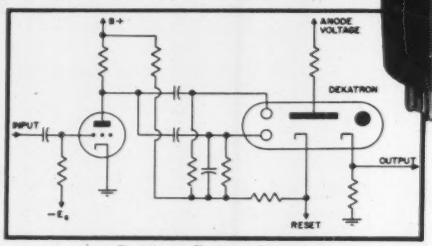
Flexible control features permit use of Chrono-log Digital Clocks and Digital Calendars in all logging, computing and programming systems.

CHRONO-LOG CORPORATION
Box 4587 **Philadelphia 31, Penna.**

CIRCLE 155 ON READER-SERVICE CARD

Simplify Circuitry using
dekatron®
Electronic Counting Tubes (up to 20,000 counts/sec.)





Typical Drive Circuit

As a user of DEKATRON cold cathode glow-transfer counting tubes, you are welcome to use this and many other drive circuits designed by us. Circuits are patented (or applied for) but are available to DEKATRON customers.

Write to us for complete information.

Baird-Atomic, Inc.
33 UNIVERSITY RD., CAMBRIDGE 38, MASS
Baird Atomic

Instrumentation for Better Analysis

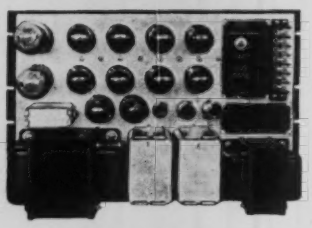
CIRCLE 156 ON READER-SERVICE CARD

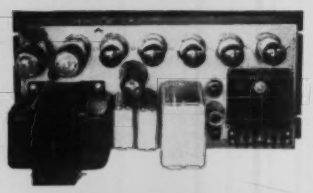
Electrical / Electronic

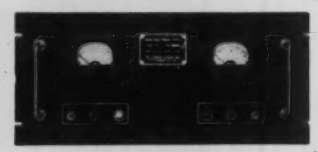
1960 BUYERS' GUIDE 3

ELECTRICAL AND ELECTRONIC MEASURING AND TESTING EQUIPMENT

POWER SUPPLIES







VOLTAGE REGULATED POWER SUPPLIES

Featuring

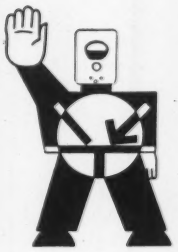
- .05% regulation for load or line variations
- 500 microvolts ripple
- 50 microseconds response time
- 10-turn voltage controls for minimum noise
- Karma (20-PPM) wire wound, low t.c. error sensing resistors
- 50 hour pre-aging
- Meters included in feed back loop for low low output impedance
- Separately fused line and load circuits
- Separate AC and DC switches
- JAN quality components
- Input: 105-125 v. 55-65 cy. single phase
- 28 Models available from stock

POWER DESIGNS INC. *presents*

SEMICONDUCTORIZED POWER SUPPLIES

featuring

ROBOTEC • HEATRAN • VOLTRAN PROTECTION



Power Designs' *Semiconductorized* Power Supplies utilize the unique properties of semiconductor devices to create new circuit concepts achieving performance, efficiency and reliability hitherto unattainable. These instruments are NOT the conventional transistorized versions of vacuum tube regulators.

ROBOTEC*

is an inherent electronic circuit producing simultaneous voltage and current cutoff upon external short circuit. The "ROBOTEC" circuit operates in 30 microseconds holding the power supply cut off until manually reset and reducing line input power to a negligible value. If an external short circuit exists the power supply cannot be turned on.

HEATRAN†

is a transistorized circuit continuously monitoring dissipation in the series power transistors of the regulator system. Dissipation above a preset maximum value is automatically transferred into external vitreous enamel resistors extending from the rear of the equipment in a perforated metal cage. "HEATRAN" thus permits fewer transistors for a given power supply capacity, more compact equipment with increased reliability and practical convection cooling.

VOLTRAN†

is a transistorized circuit continuously monitoring the voltage drop in the series power transistors of the regulator system. Voltages above a preset maximum are instantaneously absorbed thus protecting these transistors against line and load transients and permitting more conservative voltage derating.

*U.S. PATENT PENDING
†U.S. PAT. APPLIED FOR

MODEL 1515
1-15VDC • 0-1.5A
$159.50

MODEL 1515A
1-15VDC • 0-1.5A
$174.50

MODEL 3206
1-32VDC • 0-600MA
$174.50

MODEL 2050
1-20VDC • 5A
$289.50

MODEL 1210
1-12VDC • 0-10A
$349.50

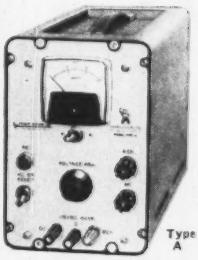
MODEL 1010T
1-100VDC • 0-1A
$374.50

MODEL 3240
1-32VDC • 0-4A
$349.50

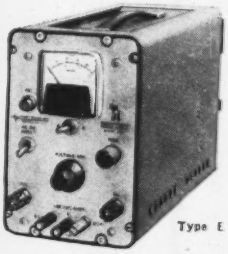
MODEL 105TA
1-100DVC • 0-500MA
$239.50

MODEL 5015
1-50VDC • 0-1.5A
$249.50

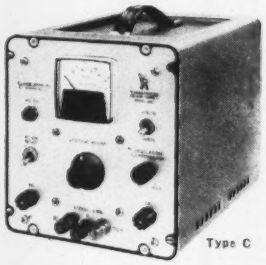
Dual Voltammeter on all models except model 1515



Type A



Type E



Type C

INPUT: 105-125VAC 55-440 Cy
REGULATION: .05%
RIPPLE: Model 1515, 1515A: 250 Microvolts
All Others—1.0 Millivolt
Internal Imp: Model 2050, 1210, 1010T, 3240; .005 ohms
All Others—.01 ohms

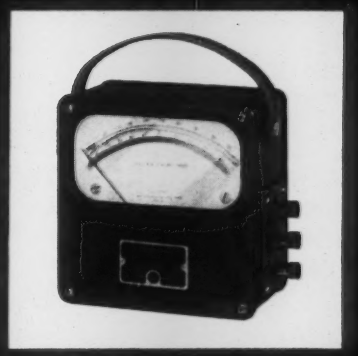
Rack Panel Adapters for Types A and B: Single Model RRA-15 $15.50, Dual Model RRB-15 $15.50. Rack Panel Adapters for Type C: Single Model RRA-20 $17.50, Dual Model RRB-20 $17.50. **F.O.B. Westbury, N. Y. Terms, ½% 10. Net 30 days. Prices subject to change without notice. Input: 105-125 v. 55-440—1Φ

Recognized Reliability *Power Designs inc.*

1701 Shames Drive, Westbury, N.Y.
Phone: EDgewood 3-6200

CIRCLE 158 ON READER-SERVICE CARD

Federal Pacific portable instruments



check vital instrumentation with accuracy... with ease

On the missile range...in delicate laboratory tests...in precision industrial production accuracy of instrumentation is vital. With Federal Pacific Portable Instruments, all types of precise equipment from simple voltmeters to complex missile tracking instrumentation can be calibrated and checked with ease—prior to use or during use. ■ Accurate, sturdy and versatile, Federal Pacific Portable Instruments are available in 6" and 8" models in the following types: A-C ammeter, milliammeter, voltmeter, wattmeter, frequency meter, power factor meter; D-C ammeter, milliammeter, microammeter, voltmeter, millivoltmeter, and voltammeter (6" only). ■ Federal Pacific Portable Instruments can be furnished in single or multiple ranges. Can operate anywhere on a line to check current or voltage. Can operate in any position to check calibration. If you can reach it... you can check it. Write for Bulletin 4340. Federal Pacific Electric Company, General Offices: Department 397, Newark 1, New Jersey.

FPE FEDERAL PACIFIC ELECTRIC COMPANY

The Best in Electrical Distribution and Control Equipment

CIRCLE 159 ON READER-SERVICE CARD

FROM MILLIWATTS TO KILOWATTS

HIGH VOLTAGE POWER SUPPLIES AND EQUIPMENT

We have sold quantities of these power supplies to laboratories, industrial concerns, the government and universities. Only the best available selected material goes into these units, so that you will have many years of dependable service. Only a few of our standard models are shown below. Quotations on special supplies cheerfully given.

PRECISE MEASUREMENTS COMPANY

HIGH VOLTAGE POWER SUPPLIES

One of the most popular power supplies on the market. Completely redesigned for greater ruggedness and convenience of operation. Widely used for powering electronic equipment and for routine breakdown and insulation testing. Output voltage is well filtered D.C. which is adjustable with convenient front panel control. Input is 115 Volt, 60 cycle A.C. Equipment is available without meter, with one meter (4½"), with two meters, or with larger 6" precision 1% mirror scale movement. Regulated models offer closely stabilized output voltage regardless of line or load changes.

Model		Maximum Voltage	Price	Price Regulated Model
6001	With Kilovolt Meter	1,000	$ 75.00	
6000		2,500	60.00	
6000-A	With Kilovolt Meter	2,500	80.00	$120.00
6005		5,000	75.00	
6005-A	With Kilovolt Meter	5,000	95.00	135.00
6010		10,000	85.00	
6010-A	With Kilovolt Meter	10,000	105.00	145.00
6015		15,000	95.00	
6015-A	With Kilovolt Meter	15,000	115.00	155.00
6025-A	With Kilovolt Meter	25,000	175.00	205.00

MIRROR SCALE HIGHER ACCURACY METERS: Recommended where more exact settings or measurements are needed. Meter size has been increased to 6 inches for easier reading. Price $35.00 additional on any meter equipped model.

TWO METER MODEL ..... ADD $35.00

INDUSTRIAL POWER SUPPLIES

These industrial type power supplies are built for service and efficiency. All are of the transformer type and employ husky components that have been selected for their power handling capacity. Controls are arranged so that operation is greatly simplified and a number of safety features are built in for maximum protection of personnel and equipment. Output is continuously variable from zero to full rated value. Polarity reversing models (as illustrated) can be had at additional cost.

Model	Voltage	Current	Price
F-500V	0-500	3 Amp	$800.00
F-6001	0-1000	2 Amp	975.00
F-6002	0-2000	1 Amp	985.00
F-6003-A1	0-3000	100 MA	375.00
F-6003-AV	0-3000	500 MA	550.00
F-6003-AK	0-3000	1 Amp	1100.00
F-6005-A1-H	0-5000	100 MA	550.00
F-6005-AV	0-5000	500 MA	750.00
F-6005-A1K	0-5000	1 Amp	1200.00
F-6010-A1	0-10,000	100 MA	800.00
F-6020-A05	0-20,000	50 MA	975.00
F-6050-T	0-50,000	½ MA	600.00
F-6100-T	0-100,000	½ MA	1100.00

Regulated Types Available

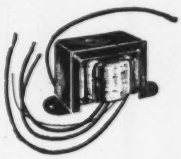
Standard hum level 5% or less. .01% to 1% ripple available. All power supplies have automatic overload cutout control circuits. Regulated models available.

HEAVY DUTY POWER SUPPLIES

For use in applications where high voltages at extra high currents are required. Illustrated is our 100 KW Model, rated for 0 to 7,000 Volts at 14 Amperes DC. This unit is housed in a single convenient cabinet. Output voltage is regulated against line and load changes. Voltage is smoothly adjustable from zero to full output. Automatic circuits protect against overvoltage or over current conditions, turning off main power in a split second. Use of special transformer construction allows constant load drain at full rated output. All power supplies in this series are available with fixed or adjustable output and with or without regulation.

Model	Voltage	Current
A-10	0-1000	5 amperes
A-30	0-3000	5 amperes
A-31	0-3000	10 amperes
A-32	0-3000	20 amperes
A-50	0-5000	5 amperes
A-51	0-5000	10 amperes
A-72	0-7000	15 amperes
A-100	0-10,000	5 amperes
A-110	0-10,000	10 amperes
A-300	0-30,000	5 amperes

TRANSFORMERS, HIGH VOLTAGE



For experimental, industrial or production applications. These units are small and compact and rated for constant service. Primary designed for 105/115/125 Volts 60 Cycle. Secondary winding has half voltage tap. Only standard models are listed, other voltages and currents available on order.

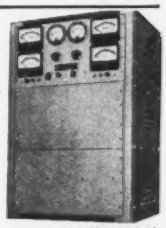
Model	Voltage	Model	Voltage
1 KVT	1 KV	10 KVT	10 KV
2 KVT	2 KV	15 KVT	15 KV
3 KVT	3 KV	25 KVT	25 KV
5 KVT	5 KV	50 KVT	50 KV

PACKAGED POWER SUPPLIES

These conveniently packaged power units will be found ideal for applications requiring minimum size and weight. Features isolated high voltage terminals permitting either the positive or negative side to be grounded. Rectifier tubes are operated from separate filament transformers so that DC output voltage can be varied from zero to full rated value. Selenium rectifier types have extra cells to assure operation under high line voltage or light loading. All standard units have well filtered DC output. Power packs with AC output available on order.

Model	Output Voltage	Current	Model	Output Voltage	Current
05-KV-5MA	500 Volts DC	5 Ma.	20-KV-1MA	20 KV DC	1 Ma.
1-KV-5MA	1 KV DC	5 Ma.	20-KV-5MA	20 KV DC	5 Ma.
2-KV-5MA	2 KV DC	5 Ma.	30-KV-1MA	30 KV DC	1 Ma.
5-KV-1MA	5 KV DC	1 Ma.	30-KV-5MA	30 KV DC	5 Ma.
5-KV-5MA	5 KV DC	5 Ma.	50-KV-1MA	50 KV DC	1 Ma.
10-KV-1MA	10 KV DC	1 Ma.	50-KV-5MA	50 KV DC	5 Ma.
10-KV-5MA	10 KV DC	5 Ma.	75-KV-1MA	75 KV DC	1 Ma.
15-KV-1MA	15 KV DC	1 Ma.	100-KV-1MA	100 KV DC	1 Ma.
15-KV-5MA	15 KV DC	5 Ma.			

CONSTANT CURRENT POWER SUPPLIES



Designed for application where output current must remain constant regardless of loading resistance changes. Used for magnet fields, plating applications, gaseous lamps. Dependable magnetic current stabilizer has no moving parts, no tubes, no transistors to replace. Simply set current to desired level, no balancing or other adjustments needed. Ideal for lamp operation since operating state ionizing voltage in no way affects lamp current. Standard hum level 5%. Lower hum levels available on order.

Model	Maximum Voltage	Maximum Current
C-25-700	25 Volts	700 Amperes
C-70-70	70 Volts	70 Amperes
C-500-10	500 Volts	10 Amperes
C-Duel 500-10	500 or 1,000 Volts	10 or 20 Amperes
C-800-2	800 Volts	2 Amperes
C-1000-100	1000 Volts	100 Amperes

Duel 500 V - 500 V, 10 Ampere Power Supply. Isolated outputs may be seried or paralleled.

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3010	0 to 3,000	300	250.00	400.00
3050	0 to 3,000	1,500	500.00	650.00
3100	0 to 6,000	3,000	700.00	1,100.00
5000	0 to 5,000	75	175.00	300.00
10K	0 to 10,000	75	200.00	350.00

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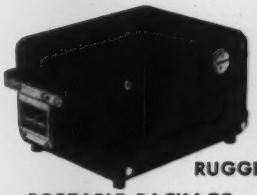

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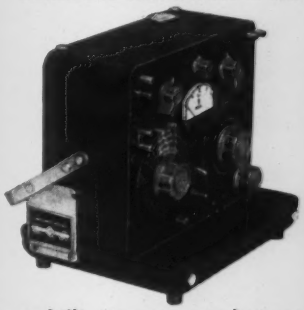

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Capacitance, series or parallel	1 μμf to 1000 μf 7 ranges	±1% ± 1 μμf (residual C ≤ 0.5 μμf)
Inductance, series or parallel	1 μh to 1000 h 7 ranges	±1% ± 1 μh (residual L ≤ 0.2 μh)
D (for series capacitance case)	0.001 to 1 at 1 kc	±5% ± 0.001 at 1 kc
D (for parallel capacitance case)	0.1 to 50 at 1 kc	±5%
Q (for series inductance case)	0.02 to 10 at 1 kc	±5%
Q (for parallel inductance case)	1 to 1000 at 1 kc	For 1/Q ±5% ± 0.001 at 1 kc

FREQUENCY RANGE: (1-kc supplied internally)
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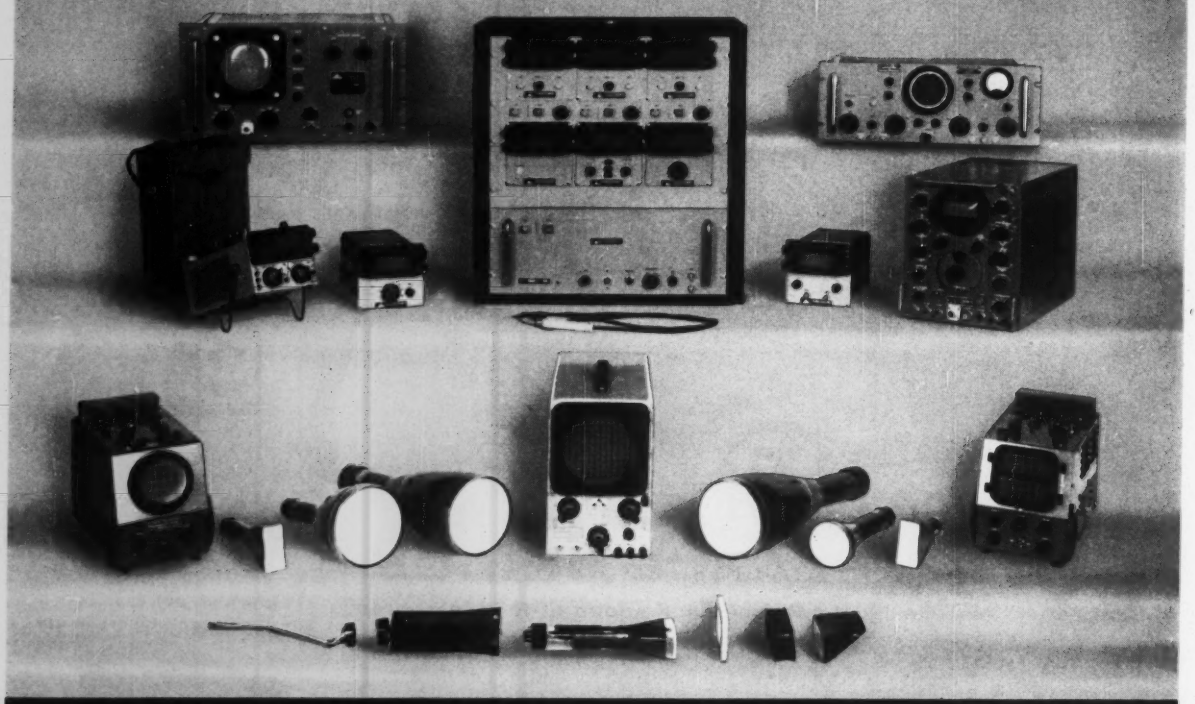

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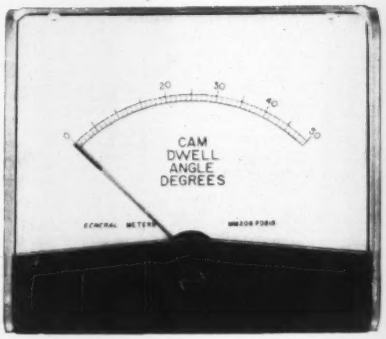

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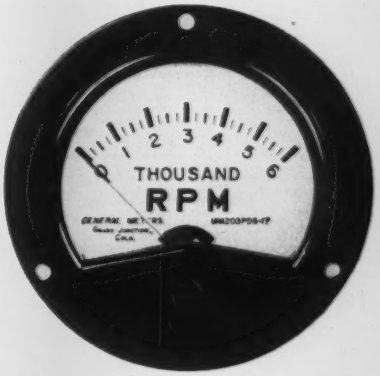

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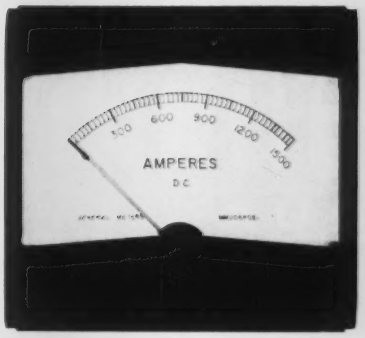

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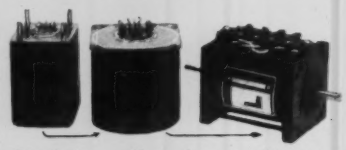

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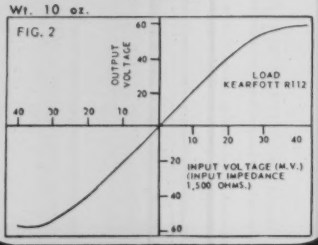

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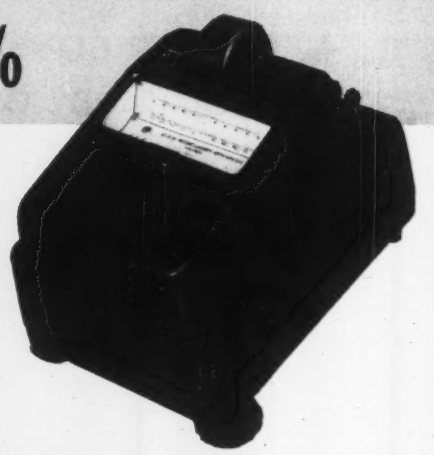

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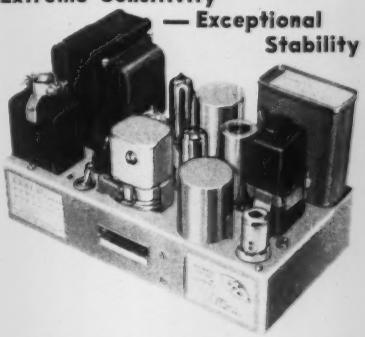

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Decade steps from 0.1 to 1 meghom.

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Accuracy: ± 0.25% on 0.1 and 1 Ohm steps; ± 0.1% on all others.

CAPACITANCE

Decade steps from .0001 through 1.0 mfd. Low zero capacitance, approximately 35 mmf. Available in 5 models.

Industrial Instruments Inc.
64 Commerce Road Cedar Grove Essex County N J

CIRCLE 173 ON READER-SERVICE CARD

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Slaughter Co Inc
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North Electric Co
Packard Bell
Philco Corp
Rixon Electronics
Sierra Electronic Corp
Stelma Inc
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CONDUCTIVITY METERS

Hagan Chem & Controls
Industrial Instruments
Kahn & Co
Magnaflux Corp
Mast Development
Waldom Electronics
Weston Instruments

COUNTERS, Decade, Electrical Impulse

Abrams Instrument
Automtaic Electric
Baird-Atomic Inc
Bowmar Intrument
Bulova Research
Burroughs Elex Tube
Canadian Marconi
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Computer Measurements
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Eagle Signal
Eberline Instrument
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CURRENT REGULATORS, including Ballast Tubes

Brach Mfg Corp
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Davenport Mfg
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Electron Arc
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Tech Apparatus Bldrs
Vickers Electric Prods Div
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Wiltec Electronics

DECADE BOXES, Resistance, Capacitance, Inductance, etc.

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Precision Line Inc
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DEMGANETIZERS

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Annis Co R B
Crucible Steel
Dyna-Empire, Inc.
Goslin Electric
Green Rectifier
Ideal Industries
Kendrick & Davis
L and R Mfg Co
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Radio Frequency Labs
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Sonoflux Div
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DEMODULATORS, Electronic

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Amelco Inc
Anadex Instruments Inc
Bulova Research
Electro-Mechanical Res
Kearfott Microwave Div
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Maxson Corp W L
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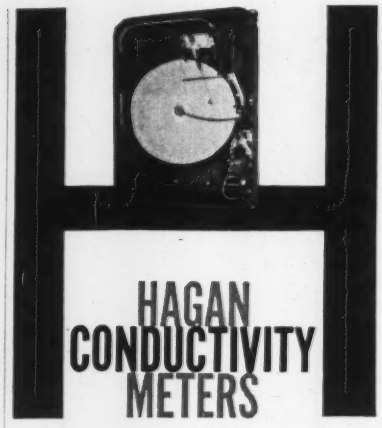
Rixon Electronics
Schaevitz Engineering
Solid State Electronics
Varo Mfg Co
Wlancko Engrg Co

DIODE TEST SETS

Allied Radio
Electro Instruments
Measurements Research
Millivac Instr Div
Minco Products
Optimized Devices
Stromberg-Carlson Co
Teletronics Lab

DISTORTION METERS

Audio Instrument Co
Boonton Electronics
Canadian Marconi
Daven Co
Electrosolids Corp
Freed Transformer
General Radio
Hewlett-Packard
Marconi Instruments



HAGAN CONDUCTIVITY METERS

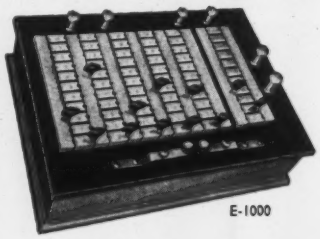
The Hagan Model H-O may be used as a single instrument, or up to four different conductivity measurements may be recorded in a single meter case. Provides continuous reliable measurement for a moderate investment.

Temperature compensation is continuous and automatic, and limit switches may be installed to activate alarms in applications where drastic changes in dissolved solids concentrations may damage equipment.

HAGAN CHEMICALS & CONTROLS, INC.
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
HAGAN BUILDING, PITTSBURGH 30, PA.
In Canada: Hagan Corporation (Canada) Limited, Toronto
European Division: Via Fiumendosa No. 13, Milano, Italy

CIRCLE 174 ON READER-SERVICE CARD

PRECISION INSTRUMENTS FOR STANDARDIZING LABORATORIES

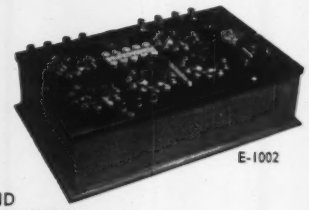


E-1000

RESISTANCE STDS.
BU. of STD. and
REICHANSTALT TYPE

ANTHONY PATTERN
WHEATSTONE BRIDGE

MUELLER BRIDGE
FOR
PRECISE TEMPERATURE
MEASUREMENTS WITH
PLATINUM RESISTANCE
THERMOMETERS



E-1002

LABORATORY AND
DEFLECTION POTENTIOMETERS

OUR FACILITIES ARE AVAILABLE FOR CALIBRATION & CERTIFICATION

BASED ON OUR OWN NATL. BUREAU OF STD CERTIFIED STANDARDS.

GRAY INSTRUMENT COMPANY
448 MILL ROAD
ANDALUSIA, PA.

CIRCLE 175 ON READER-SERVICE CARD

CIRCLE 176 ON READER-SERVICE CARD →

"SENSITIVE RESEARCH"... DEPENDABILITY... A TRADITION SINCE 1927.

Your inspection of our modern facilities is welcomed. We'd be delighted to show you how a fine instrument is made.

SHORT FORM CATALOG...

OF ELECTRICAL INDICATING INSTRUMENTS,

AC and DC Standardization Consoles, and related test equipment for the accurate measurement and certification of current, voltage, power, frequency and magnetic quantities.

Our periodic publication *ELECTRICAL MEASUREMENTS* is available upon request. Write for our complete current catalog.

Model LTC*—AC-DC/DC calibration console. *Accuracy*—.05% *of actual reading. Ranges—.5 v. to 1111.5 v.; 1 ma. (2 ma. on AC) to 11.115 amps. Resolution — .01%. Frequency — DC to 25 kc. Other consoles are:

Model	*% Accuracy*	*Ranges*
LTD	.05 of reading	.1 v. to 1111.1 v.; 1 ma. to 11.111 amps. DC
LTCA	.05 of reading	.5 v. to 1111.5 v.; 2 ma. to 11.115 amps. AC-DC
LTA	.05 of full scale	.3 v. to 1500 v.; 2 ma. to 30 amps. AC-DC.
LTHD	.05 of reading	0-1.6 amps.; 0-1.6 v. DC.

LABORATORY STANDARDS

Model LW — AC/DC Single Phase Wattmeter. Accuracy—.1% f.s. Multirange combinations available from 25 w. through 6 kw. f.s. at 75/150/300 v. f.s. and 80% minimum p.f. Frequency compensation to 1000 c.p.s. on special order. 12" vernier scale.

Model RFVC — Radio frequency Self Checking RMS voltmeter for the certification of VTVM's from DC to 10 Mc. Accuracy—.3% of full scale ±.2% frequency influence. Ranges—.01/.1/1/3 v. Checks its own accuracy against a .05% stable internal standard source.

Model DYL Model THACH

Model DYL — AC. Accuracy—.1% f.s. 60 or 400 c.p.s. Ranges 10/20/50/100/200/500 ma.; 1/2/5/10 amps.; 20/50/100/200/500 v. f.s. 12" venier scale. **Model THACH** — AC/DC *Self Checking* Volt-Amp-Milliammeter. Accuracy — .2% f.s. to 4 kc. Ranges — 10/20/50/100/200/500 ma.; 1/2/5 amps.; 1/2/5/10/20/50/100/200/500/1000v. f.s. Checks its own accuracy against an internal standard cell. Special regulated **THACH Power Supply** (optional) automatically shuts off power to the THACH when switching ranges, reducing possibility of accidental overloads. Output is DC or 60 c.p.s. (400 c.p.s. can be plugged in).

Model BS — *Self Checking* DC Volt-Amp-Milliammeter. Accuracy .05% f.s. 35 ranges. .3 v. to 1.5 kv.; 1.5 ma. to 15 amps. f.s. Checks its own accuracy against an internal standard cell. **Model B** — DC Accuracy .1% f.s. Multirange I or E combinations from 30 μa. and 50 mv. to 1000 amps. and 10 kv. f.s. **Model L** — AC/DC Accuracy .1% f.s. Multirange I or E combinations from 50 ma. and 30 v. to 20 amps. and 1 kv. Frequency compensation to 1000 c.p.s.
Models BS, B and L have 12", hand-drawn vernier mirrored scales. Diamond Pivots and shock-mounted jewels.

SENSITIVE RESEARCH INSTRUMENT CORPORATION

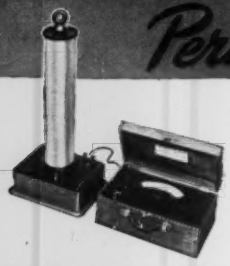
ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927

NEW ROCHELLE, N. Y.

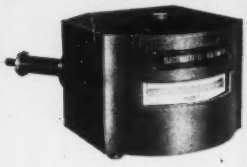
Symbol of Quality

Permanently Precise!

AC-DC ELECTROSTATIC VOLTMETERS



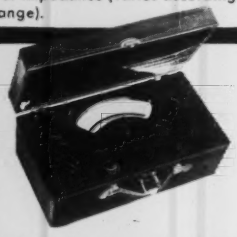
Model CRV — Crest or peak voltmeter for reading true RMS, negative peaks and positive peaks. Accuracy—1% f.s. for basic 0-1 kv. instrument. 1% multipliers available up to 100 kv. for AC or pulsed DC measurements. 5.2" scale. For pulses of 20/sec. or more. High input impedance (varies according to range).



Model ESH - Accuracy-1% f.s. (.5% on special order). Single or multirange combs. from 5 kv. to 100 kv. f.s. 6" scale. Input impedance up to 5 x 10^{15} ohms. Reads true RMS. Switch controlled from rear. Transit lock and brackets for panel mounting available. Adaptor for peak voltage reading. All electrostatics have a modified square law scale.

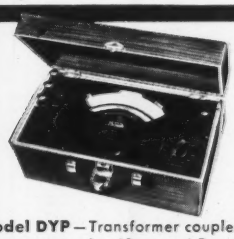
Model ESD — Accuracy — 1% f.s. (.5% on special order). Single or multirange from 120 v. to 6 kv. f.s. 5.2" scale. Reads true RMS. Input impedance 10^{15} ohms. **University Model**—Accuracy—1%; ranges from 300 v. to 5 kv. f.s. 4" scale. **Model VPA**—Peak voltage adaptor up to 30 kv. maximum inverse peak rating.

AC-DC POLYRANGERS



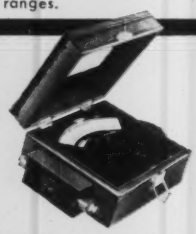
Model U88 — Accuracy — .5% DC; .75% AC/DC f.s. (thermocouple side). 88 ranges f.s. from 200 μa. to 1.5 amps.; 20 mv. to 750 v. DC, and 10 ma. to 3 amps.; .5 v. to 750 v. AC/DC. Frequency 5 kc. on E and 15 kc. on I. 5.2" scale. Automatic Temperature Compensation. **Model USP**—similar to above but 28 ranges.

Model C — Rugged DC, .25% f.s. accurate reference standard. 14 ranges f.s. from 1.5 ma. to 3 amps.; 1 v. to 1 kv. (2 combs.) 1 sec. period. 6.3" scale. **Model WVA** — same, but 27 f.s. ranges from 1 ma. to 15 amps.; 100 mv. to 1 kv. **Model S**—Accuracy-.5%. Sensitivity to 10,000 ohms/v.; 5 mv.; 100 μa. 13 ranges. 5.2" scale.



Model DYP—Transformer coupled dynamometer for 60 c.p.s. AC testing. Accuracy — .3% f.s. 20 f.s. ranges from 5 ma. to 10 amps.; 5 v. to 2 kv. 6.3" scale. **Polyrangers** are portable, general purpose I and E measuring instruments. Other models and range combinations available. Write for a complete listing.

AC-DC THERMOCOUPLE INSTRUMENTS

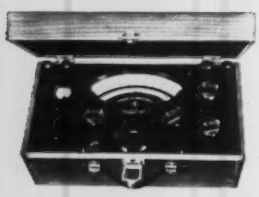


Model XT—R.F. ammeter. Accuracy —1% f.s. DC to 70 Mc. Single range from 1 amp. to 100 amps. (higher on special order). Automatic Temperature Compensation. 6.3" scale. **Model RF**—same, but ranges 1 ma. to 1 amp. f.s. Frequency — 1 Mc. (4 range unit 250 kc.). **Model AU** — Accuracy-.5% (on special order) up to 20 kc.

Model A—Accuracy—.75% f.s. (.5% on special order). Single or multirange switch controlled f.s. ranges from 1 ma. to 1.5 amps.; .2 v. to 1.5 kv. Frequency — up to 7 kc. on E; 15 kc. on I. Automatic Temperature Compensation. 6.3" scale. Thermocouple instruments are available with a thermocouple replacement feature and overload protective shunt.

Model RFV—Radio frequency voltmeter. Accuracy — .5% f.s. ± .5% max. frequency influence on switch controlled multirange units from 1 v. (5 Mc.) to 300v. f.s. (150 kc.). Single range instruments of 1v. or 3 v. f.s. have an upper frequency limit of 10 Mc. Automatic Temperature Compensation. 6.3" scale. Can be certified on DC. Frequency influence constant.

DC CORROSION AND ELECTROLYSIS INSTRUMENTS



Model PV — Potentiometer voltmeter — measures *true potentials* with zero current drain. Accuracy — .5% f.s. Multirange combs. from 2 mv. to 20 v. f.s. 5.2" scale. **Model ZR**—Zero resistance micro-milliammeter having a *zero volt loss*. Accuracy—.5% f.s. Multirange combs. from 10 μa. to 300 ma.

Model HS-COR — Designed for rugged field use for A. T. & T. and Bell Tel. Labs. Accuracy — .5% f.s. Multirange combs. from 5 mv. to 100 v. Sensitivities to 1 megohm/v. 6.3" scale. Features the *formica case, Diamond Pivots, and special non-slip binding posts for alligator clips.*

Diamond Pivots and shock mounted jewels are included in all Laboratory Standards and ultra high sensitivity instruments (thermocouple meters, low resistance microammeters, etc.) They are many times more shock resistant than conventional pivots and jewels, and their installation assures a friction free moving element under the severest operating conditions.

Symbol of Quality

SENSITIVE RESEARCH

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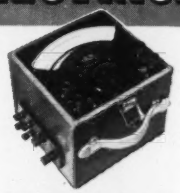
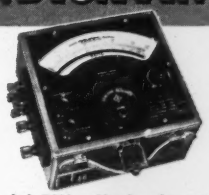
ELECTRICAL INDICATING INSTRUMENTS

AC-DC WATTMETERS



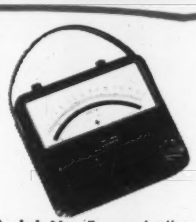
Model PDLW — Polyphase wattmeter for use down to 20% p.f. Accuracy—.75% f.s. up to 500 c.p.s. Multirange combs. from 1.5 w. to 2.4 kw. f.s. at 75/150/300 v. f.s. (frequency limits of 2.5 kc. on special order) 5.2" scale. **Model PDW** — same, but accuracy — .25% f.s. down to 50% p.f. and up to 800 c.p.s. Ranges from 15 w. f.s. at 50/100/200 v. f.s. 6.3" scale.



Model DW — Single phase reference standard wattmeter. Accuracy — .25% f.s. to 50% p.f. and up to 800 c.p.s. Multirange combs. from 5 w. to 2 kw. f.s. at 50/100/200 v. f.s. 6.3" scale. **Model DLW**—same, but accuracy .5% f.s. down to 20% p.f. and up to 500 c.p.s. Ranges from .2 w. f.s. at 75/150/300 v. **University Model** — same, but 4" scale and reduced accuracy.

Model VAW — Volt-Amp-Wattmeter. AC. Accuracy — .5% f.s. for E. and I.; .75% f.s. for w. Ranges for "50-800 c.p.s." model—50/100/200/250/500 w.; 1/2.5/5 kw. f.s. at 100/200/500 v. f.s. down to 50% p.f.; "50-125 c.p.s." model has additional ranges of 12.5/25 w. f.s. and 25/50 v. f.s.

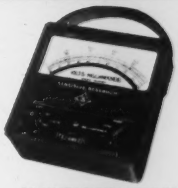
AC-DC VOLTMETERS AND AMMETERS



A *NEW* portable Field instrument

Model N — Economically priced, rugged DC and AC voltmeters and ammeters. Accuracy — .5% f.s. Switch controlled. Range combs. — 50 mv. to 1.5 kv. (up to 5 k.-ohms/v.); 50 μa. to 50 amps. DC; 5 v. to 750 v.; 10 ma. to 10 amps. AC. *Long 6" scale. Moulded bakelite case with carrying strap. Can be supplied for panel mounting.*

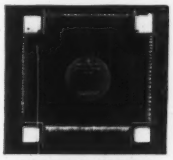
Portable double pivoted D'Arsonval,[1] dynamometer,[2] and moving iron[3] instruments. Single and multirange. Switch controlled to 5 amps. and 1 kv. Self-contained to approximately 20 amps. and 1.5 kv. (DCHI to 30 kv.)



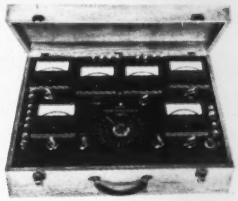
UNIVERSITY MODEL

Model	*Accuracy*	*Scale*	*F.S. Ranges Start At*
[1]C	.25% f.s.	6.3"	DC 30 μa; 50 mv.
[1]S	.5% f.s.	6.3"	DC 1 μa; 1 mv.
[1]UNIV.	.5% f.s.	4"	DC 2 μa; 1 mv.
[1]DCHI	1% f.s.	4"	DC 1.5 kv. 50k Ω/v.
[2]D	.25% f.s.	6.3"	AC/DC 5 ma; 1.5 v.
[2]UNIV.	.5% f.s.	4"	AC/DC 10 ma; 7.5 v.
[3]MI	.5% f.s.	6.3"	AC 10 ma; 7.5 v.

MAGNETIC TESTING INSTRUMENTS



EPSTEIN FRAME



Model MAT

Test set, designed in accordance with ASTM specifications (sec. A341-49 and A343-49), for core loss measurements, determination of hysteresis loops and magnetization curves, magnetic field and AC permeability tests. Inductors above and below 1 amp. available. Includes automatic internal power compensation circuit. Contains a DC ammeter, AC ammeter, RMS voltmeter, flux voltmeter, low p.f. wattmeter, and fluxmeter with convenient overlapping ranges. **Model COL** — core loss test set with special .25% f.s. accurate flux voltmeter (6.3" scale), RMS voltmeter, ammeter and wattmeter.

Model FM — a zero torque multirange fluxmeter calibrated in maxwells. Reads changes in flux linkage of a search coil as it moves in a magnetic field. Accuracy-.5% f.s. Sensitivity 1000 lines/div. using standard 10 turn search coil (1000 turn coil = 10 lines/div.). 5.2" scale. **Calibrated search coil and magnet** available for certification purposes.

AC-DC PANEL INSTRUMENTS

SRIC instruments have hand-drawn mirrored scales, electrostatic and magnetic shielding and temperature compensation. Portables in general conform to ASA specs C39.1-1951 for either .25% or .5% class instruments. *All SRIC products are calibrated against primary standards that have National Bureau of Standards Certificates of Accuracy and are unconditionally guaranteed for materials and workmanship for a period of one year.*

Model JWSP

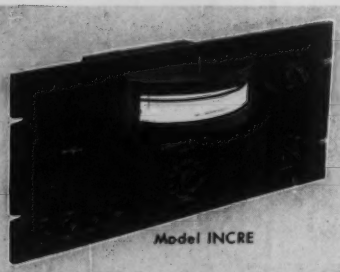
TYPE EW CASE

All of the models described in this brochure, and in our complete catalog, are available as edgewise panel instruments with *no loss in accuracy or sensitivity*. Scale lengths — 5" (type EW-5) and 7" (type EW-7). Switch controlled. Single or multirange. In some cases, such as polyrangers, they are supplied mounted in standard 19" rack panels. **Model JW** — Accuracy — .5% f.s. Max. of 3 DC ranges (B.P.'s only) from 2 μa, and 1.5 mv. f.s. Scale 4". ***New* Model JWSP** — same, but can contain up to 10 switch controlled ranges. **Rectangular DC and AC models** available at accuracies from .5% to 1% f.s.

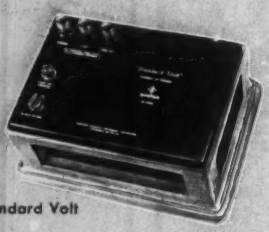
INSTRUMENT CORPORATION

ELECTRICAL INSTRUMENTS OF PRECISION SINCE 1927

SPECIAL INSTRUMENTS
by SENSITIVE RESEARCH



Model INCRE

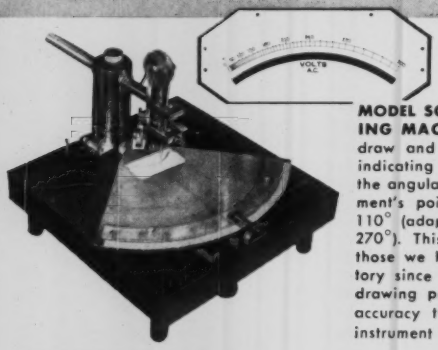


Standard Volt

Model INCRE — Differential Incremeter. ***A NEW .05% f.s. accurate expanded scale DC standard*** for rock panel mounting or portable use. Combines the high comparison accuracy of the differential instrument with a .005% stable source. Scale has an effective length of 63" or 70", and a resolution of 1000 divisions. Each 10% of any range is expanded over the instrument's *actual* 6.3" or 7" scale length. Direct reading! No balancing or nulling! Single or multirange combinations from 200 μa. to 10 amps. and 200 m.v. to 1 kv. **The Standard Volt** is the internal source used, and is available separately. Input 115 v. 60c.p.s. 25 va. Output 1.0 v. and 1.0185 v. to within .01%. (Exact E. can be certified to .001%).

Model RA measures the ratio of 2 DC currents or voltages. Accuracy — .25% max. Minimum current per coil 50 μa. Scale reads 0 to ∞. Special scales as required.

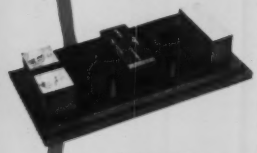
Model FRE — Frequency meter. Accuracy — .25% of center frequency (expanded scale), or of f.s. value (zero left). Ranges e.g.; 54 — 66 c.p.s.; 350-450 c.p.s.; or 0-100 c.p.s. f.s. Nominal input 115 v. and/or 230 v. ±15%. 6.3" scale.



MODEL SCAMA — SCALE DRAWING MACHINE used to manually draw and print any flat electrical indicating instrument scale where the angular deflection of the instrument's pointer is no greater than 110° (adapter available for arcs of 270°). This unit is a duplicate of those we have used in our laboratory since 1927 and is capable of drawing precision scales to all the accuracy that the resolution of an instrument will permit.

INSTRUMENT ACCESSORIES

VACUUM THERMOCOUPLES (Instrument type)—Sensitivities from 1 ma. to 1 amp. Output approximately 8-10 mv. open circuit. UHF types. Isolated or contact heaters. Special long-time constants. AIR COUPLES to 100 amps. (higher on special order).



LABORATORY STANDARD SHUNTS—Accuracy—.1% or .05%. Potential drop 50 mv., 100 mv., or 300 mv. Values from 1 amp. to 1000 amps. Rated for continuous duty.

MULTIPLIERS—Available to extend voltage ranges of all instruments. Accuracy — .1% or .05%.

FORMICA CASES are available for all portable instruments normally supplied in a wood case. They are structurally strong, a good dust and humidity barrier, and will look like new for the life of the instrument.

MODEL STC — Miniature Standard Cell. Accuracy — .025%. Nominal output 1.0185 v.

Specifications subject to change without notice.

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Recording instruments for all conductivity applications in both line and battery powered types.

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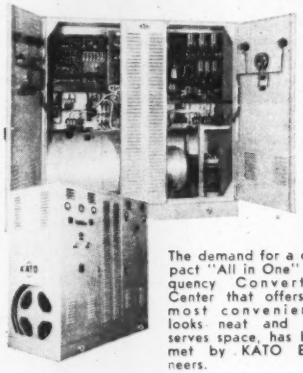
FULLY HOUSED FREQUENCY CONVERTING SYSTEM!



The demand for a compact "All in One" Frequency Converting Center that offers utmost convenience, looks neat and conserves space, has been met by KATO Engineers.

Housed within this cabinet are a KATO MOTOR Generator and all the necessary controls that include the KATO manufactured "REGOCITER", static exciter regulator as well as reduced voltage synchronous motor starter.

KATO'S SYSTEMS APPROACH to power conversion offers the advantage of the size and type of motor generator set with the necessary controls to meet your exacting requirements.

A COMPLETE LINE OF AC GENERATORS ADAPTABLE TO ANY INDUSTRIAL ENGINE.

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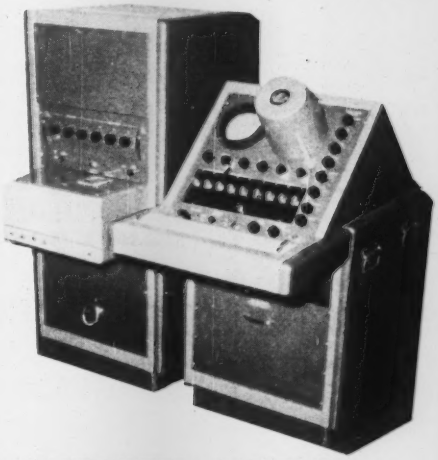

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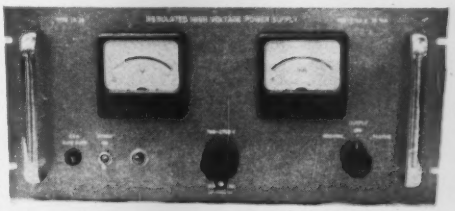
with automatic printout and automatic cycling.

The only instrument especially built for mass producing damping data.



MODEL LS-25 POWER SUPPLY

provides stable and easily-variable high-voltage for measurements involving especially photomultipliers

One ten turn range from 750-2750 volts at 25 mils.

Combined polarity and on-off switch operable under load.

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REED FREQUENCY METERS • ELAPSED TIME METERS
TOGGLE, LEVER and ROTARY SWITCHES of Instrument and Test Equipment Quality
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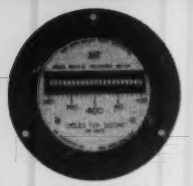
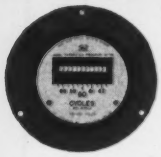
CONTINUED ON NEXT PAGE ➔

Model 30-F
Dual Range, Double Window



Model 36-FX-21
21-Reed Meter in 3½" Case



Model 34-FHXX-11
11-Reed in 3½" Sealed Case

MS35058-21

ST27N

Model 41-FX-42
300—500 cycles and
380—420 cycles, 4" case.

Model 15-FHAC
2-Reed in 1½" Sealed Case

Model 33-FP-9M
TS-328 A/U (400 cy. type)

MS35059-27

MS25068-27

VIBRATING REED FREQUENCY METERS

Meters illustrated are used wherever constant or known frequency is important to efficient operation of equipment.

- ***Permanently Accurate*** **within ±0.3% or better at reference temperature, depending on the model. This accuracy is not affected by poor wave form, external magnetic disturbances, or voltage fluctuations.**
- ***Size and Type for Every Service.*** **Made in many portable and panel styles and reed groupings; 12-650 cycles and above.**
- ***Rugged Construction*** **of simplified, patented design, with no moving parts to wear out or get out of calibration.**
- ***Suitable for Electronic Circuits.*** **Power consumption is comparatively low, and J-B-T reeds have high Q with prompt, sharp response.**

3½", 2½" and 1½" SEALED Types

3½" FHXX Meters, sealed glass-to-metal construction with solder terminals, meet or exceed the sealing, mounting and electrical requirements of JAN-1-6 and MIL-M-6A, including the 3000 volt breakdown. Barrel diameters, $2^{11}/_{16}$" —overall depth behind flange, 2⅞"... New 2½" Models 21-FHXX and 23-FHXX now are cataloged... The 1½" Sealed Size is illustrated by Model 15-FHAC, above, 60 and 400 cycles, 2 reeds, 8-10 volts, for cathode follower circuits as in standardizing output of audio oscillators... also 15-FH Series, 5 reed, 58-62 cycles, 100-130 volts, or 390-410 cycles, 110-130 volts. Barrel, 1½" dia., detachable flange, 2.094" dia., solder terminals.

REED RELAYS AND TACHOMETERS

Please give circuit requirements when requesting quotations on J-B-T *reed relays* and *oscillator controls:* (1) plug-in can type which responds to or controls respectively a transmitted signal such as 200 cycles in mobile or other communications equipment; (2) a new type relay, patent pending, which has no vibrating reed contacts, and often needs no further signal amplification. This device also will be made as a *frequency limit control* with reed indication.

For *tachometers* to read r.p.m. by resonance alone—no electrical or complicated mechanical connections—request Bulletin MT-458.

ASK FOR CATALOG 558-B

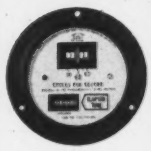
ELAPSED TIME METERS

For Maintenance, Tube Life and Operating or Test Time Records; Model 31-ES, 3" rectangular case (illustrated) registers in 1/10 hour steps to 9,999.9 hours, then resets automatically. Most popular, Model 31-EX (3½" round case) normally is stocked for 60 cycles, 100-130 volts. Variations such as 50 cycle; 230 volts; 0-99,999 hours; readings in minutes; 2½" clear-plastic rectangular case—are available on special order.

SEALED ELAPSED TIME METERS

60 or 50 cycle, Model 31-EHXX, same as 31-EX above but fully sealed, with glass-to-metal construction, solder terminals, and 3½" detachable flange to match XX metal frequency meter case. 1000 volt breakdown—Model 21-EHXX, 2½" sealed 60 cycle meter has full size counter 400 cycle, Model 33-EHXX, 110-125 volts, has same sealed construction, but 2¾" barrel dia., 4" deep behind panel.

FREQUENCY—ELAPSED TIME METERS



One combination meter saves panel space and does the work of two. Model 31-FE (illustrated) has 3¼" flange, metal case $4^{1}/_{32}$" deep; 5 reeds, 58-62 cycles. On special order 7, 9, or 11 reeds, or 50 cycles, or 3½" case (known as 31-FEX-1) can be supplied.

DISTRIBUTOR SERVICE

Standard J-B-T items are available through authorized electronics parts distributors.

TOGGLE SWITCHES AN, JAN, or MIL

More than 140 models of exceptional-quality toggle switches, all designed for Government specifications, now are manufactured by J-B-T. The heavy-duty models feature solid coin-silver contacts, unique to J-B-T, which add overload protection and keep contact resistance under .005 ohms. Nominal ratings are 20 amp. at 125 VAC, 10 amp. at 250 VAC, unless otherwise indicated.

ST40, 42, 50, 52 series—Single-pole and double-pole, heavy-duty, for JAN-S-23, MIL-S-21195A (Ships), and Ordnance Standards DDAX. Solder and screw terminals.

MS35058, 35059 series—Lever seal for sand, dust, and 15 ft. water submersion tests; single-pole, double-pole, heavy-duty for MIL-S-3950A (significantly modifying MIL-S-3950). Specification covers screw terminals with solderable finish.

MS25068 series—Four-pole, with lever seal, heavy-duty types; 8 models for MIL-S-3950A. Screw terminals with solderable finish.

AN3021, 3027 series—Aircraft types with lever seal, single-pole and double-pole, heavy-duty, for MIL-S-6745. Screw terminals.

ST12, 13, 16, 17, 22, 23, 26, 27 series—Medium-duty types, for JAN-S-23, MIL-S-21195A (Ships), Ordnance Stds. DDAX. Double-grip, self-cleaning contacts; current-carrying parts heavily silver-plated. Threaded bushings are $^{2}/_{4}$" or ¼" long; solder terminals, rear or side-connected. Nominal rating 6 amp., at 125 VAC 3 amp., 250 VAC.

MS25098, 25100 series—Medium-duty types, single-pole, double-pole, for MIL-S-3950A, with lever seal for sand, dust, and 15 ft. water submersion tests. Threaded bushings $^{2}/_{4}$"; solder terminal connections at rear. Nominal rating 6 amp. at 125 VAC, 3 amp. 250 VAC.

Design Note—MIL-S-3950A is the latest and most comprehensive specification. It ultimately is expected to supplant most of the other specifications.

For further technical information, please request Bulletin TS-6B.

ROTARY SWITCHES

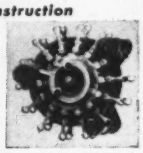
MOLDED

For dependable performance in quality test equipment, instruments, inspection setups, and avionics, J-B-T makes 3 compact types—the 14 pos. (2" dia.) MS-14 molded series or the SS-14 laminated series, and the 20 pos. ($2^{23}/_{32}$" dia.) MS-20 molded series... Available in 1 to 6 decks (more on special order), shorting or non-shorting. The molded MS-14-2 is shown.

CONTINUED ON NEXT PAGE ➔

J-B-T INSTRUMENTS, INC. NEW HAVEN 8, CONN.

Laminated Construction



LAMINATED

The 14 pos. rotary switches (SS-14-2 illustrated) are conservatively rated for carrying 1 amp., 125 volts AC, inductive load; maximum momentary (not make-and-break), 5 amp.; maximum voltage between contacts and ground, 1500 volts R.M.S.; between decks and ground, 2000 volts R.M.S. Average contact resistance is 0.007 ohms or less.

SOME NEW IDEAS IN SWITCHES

Bonded Construction

Ruggedized versions of the MS-14 and MS-20 molded switches may be ordered with bonded construction as MS-14B- or MS-20B- . Thus, a 14 pos. two-deck switch is MS-14B-2. Cured laminations bond the adjacent decks for ruggedization, shock-proofing, and further enclosure. The additional cost of this feature is moderate.

6-POLE DOUBLE-THROW PER DECK

Double-throw switching, 6 circuits per deck, becomes easy with this variation of the MS-20 switch. The illustration shows the internal construction of MS-20-1-6DT with back protective cover cut away. As in all J-B-T molded switches, sturdy construction features include 3-post deck suspension, double-grip collector arms, rectangular drive shaft thru decks for reliable indexing, and heavy, fine-silver plating for 100 hour salt spray test.

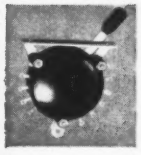
RING-CONTACT to Eliminate Soldering

Molded MS-14R- (per print SK-88) and MS-20R- (per print SK-89) switches are available on special order with the outside edge of all contacts held together by an integral ring as illustrated in the MS-20BR-1 (which coincidentally is bonded). The exclusive ring construction eliminates the need for soldering jumpers between adjacent contact positions and assures excellent connections. The rings, which add 7/32" to the O.D. of the switch, can be easily cut out between contacts, making this type excellent for development work or assembly savings.

NEW ENCAPSULATED (XX) TYPE

In response to requests for extra-high reliability switches which are vaportight and fully encapsulated, J-B-T is producing on a custom basis switches of the MS-14XX- (diameter 2⅜") and MS-20XX- series. Please request sketch SK-107 and data on properties of encapsulation material. Gland-sealed shaft and rear connections by coded wire, pins, or AN connector, will be quoted on request.

LEVER ACTION SWITCHES



Model MS-20-1L5A-1 (illustrated) provides 5 live positions, 2 circuits per deck, in a molded body. Ten other 3 and 4 position lever switches use the same top-quality parts as laminated SS-14 switches. For ganged-lever switches request print SK-74 on the SSG types, in 3, 4, or 5 positions, 2-10 decks.

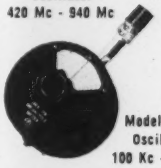
ASK FOR CATALOG 558-B

J-B-T INSTRUMENTS, INC.
NEW HAVEN 8, CONN.

Megacycle Meter

Model 59
Oscillator
2.2 Mc - 420 Mc

Model 59-UHF
Oscillator
420 Mc - 940 Mc



Model 59-LF
Oscillator
100 Kc - 4.5 Mc

Determines resonant frequency of tuned circuits, antennas, transmission lines, by-pass condensers, chokes, etc. Measures inductance and capacitance. Also used as a signal generator, wave meter, frequency meter, and in many other applications.

This compact, lightweight grid-dip meter is available in the frequency ranges indicated.

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BOONTON, NEW JERSEY

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HERMETICALLY SEALED
and Ruggedized
3½" and 2½" Sizes
Meeting all MIL Specs

Normal Frequencies
25, 50, 60 or 400 Cycles
Special Ranges
from 15-1500 cycles

ALSO IN OTHER TYPES

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SWITCHBOARD MOUNTING: 7¼" round surface, or 4½" square semi-flush cases.
PORTABLES: In large or small cases.

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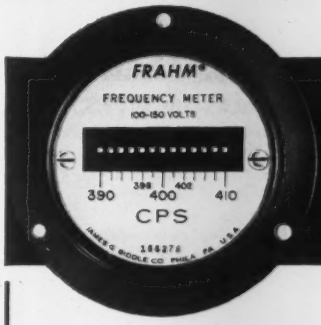

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FREQUENCY METERS

....in Switchboard, Miniature and Portable types
....indicate alternating current frequency from 15 up to 1500 cycles per second
....applicable to pulsating or interrupted D-C as well as A-C supply circuits

Frahm Resonant Reed Miniature Sealed Type Frequency Meters are hermetically sealed to withstand excessive humidity, dust, fungus attack, moisture (as aboard ship) and other destructive atmospheric conditions. Available in 2½" and 3½" sizes.

Frahm Frequency Meters can be specially designed to your specifications for range, methods of activating, scale graduations, etc. We invite your correspondence.

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"MAJOR" Small size constant pressure, 500 Volts DC, 100 megohms. Extra ohm scale. Bulletin 465

"STANDARD" Heavy duty constant pressure 500 or 1000 Volts DC. Ranges to 2000 megohms. Bulletin 455

BATTERY VIBRATOR TYPES

"MODEL B-7" Precision Ohmmeter-Megohmmeter. 2 megohm ranges, 2 ohm ranges, 2 test potentials. Bulletin 440

"MODEL B-6" 4 instruments in 1. Ranges: 200 megohms, 2000 ohms, AC & DC volts up to 600. Bulletin 441

PLUG-IN-TYPE

115 V. AC line Operated. **New Model P-1** Test Potential 500 V. DC or 1000 V. DC. Ranges: 0-100 or 0-1000 or 0-2000 Megohms. Bulletin 451

ELECTRONIC TYPE
20,000,000 Megohms

Model 29A with 11 ranges. Measures from 300,000 ohms to 20 million megohms. Test Potentials 85V DC and 500V DC. Bulletin 1029

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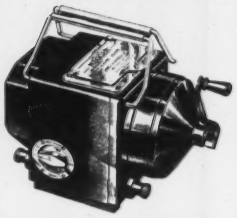

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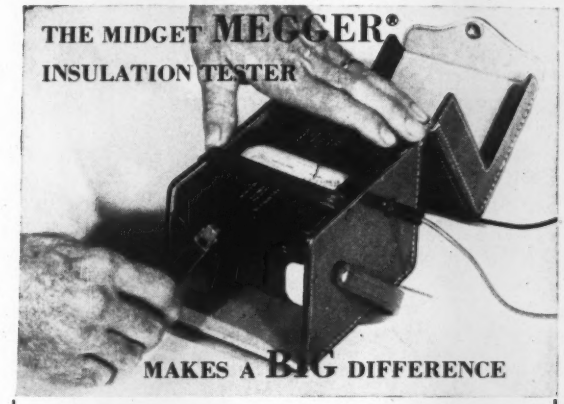

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The operating span of electrical equipment can be shortened considerably by accumulations of *dirt* and *moisture*.

Only by periodic insulation resistance measurements can you be sure of the condition of electrical insulation in your machines. Test with a dependable Megger Insulation Tester and keep records of each piece of equipment.

For Convenience and Protection, use the MIDGET "MEGGER" INSULATION TESTER. Write for **BULLETIN 21-85-I.**

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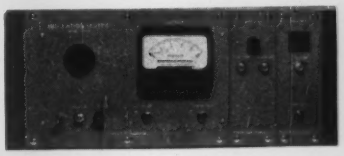

☆ Non-destructive Sensitive Hipot Testers with 5 μa circuit breaker from 2 KV to 50 KV.

☆ Corona Test Sets from small inexpensive portable units to large 100 KVA units, any voltage range.

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TRANSISTORIZED D-855 GAUSSMETER

- Complete portability for use in field or lab
- Reads flux fields up to 30,000 gauss
- Can be equipped to read Earth's field flux density
- Probe is only .025" thick
- Active area of probe .01 square inches
- Fully transistorized
- Power Supply: selective from 105-125 volt 50-60 cycle line or internal batteries
- Net weight: 8-3/4 lbs.
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Precision built, completely transistorized, the new D-855 Gaussmeter accurately measures flux density and determines "flow" direction. Ideal for measuring and locating "stray fields", plotting variations in strength and checking production lots against a standard. It's simple to operate. The Dyna D-855 doesn't require jerk or pull, gives no ballistic reading. Can be operated in the field with batteries which are enclosed in rugged protective carry case. This is an improved version of the pioneering D-79 Gaussmeter (Pat. #2,707,769) which has modernized magnetic flux measurement for the past six (6) years.

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Ranges 100 V to 35,000 V, AC or DC. Resistance exceeds million megohms. Can measure static electricity.

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New type, high frequencies, low power factors, very low wattages — *write for new bulletin.*

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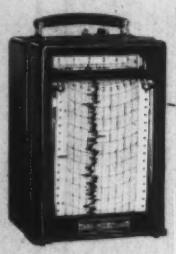

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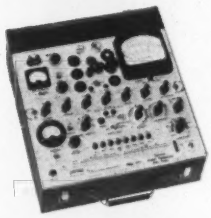
MODEL 1230—Card programmed to automatically set-up predetermined voltages and conditions for each tube under test. Self-calibrating and accurate within 1 to 3% of best known standards for transconductance and plate current measurements. Reject levels set in accordance with military specs. Also permits special purpose tube tests to meet specific circuit requirements. Portable style with cover.



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MODEL 1575—Meets Western Electric specifications as a Mutual Conductance tester. 0-60,000 micromhos in 7 ranges. Two separate meters for line and grid bias voltage indications. Has 4 signal voltages. Features new, voltage regulator tube test. Built-in roll chart. Portable style with cover.

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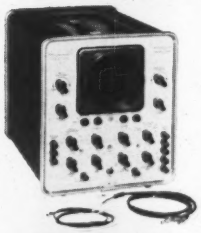

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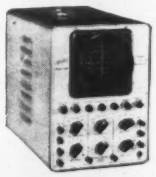

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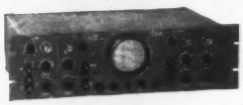
MODEL 685—Features identical amplifiers DC to 750 kc—1 cps to 750 kc. 0.5 microseconds rise time. Sensitivity—20 millivolts RMS vertical (30 horizontal). Recurrent or triggered sweep. Covers 1 cps to 10 kc in 5 calibrated decade ranges with vernier control of 10 to 1. External sync for triggering and synchronizing the built-in sweep generator.



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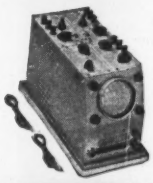
MODEL 387R—Identical horizontal and vertical amplifiers. Triggered or recurrent sweeps from 1 cps to 100 kc. Slow sweeps (10 seconds or more) with external capacitors. 10 millivolts RMS per inch vertical sensitivity (14 horizontal).



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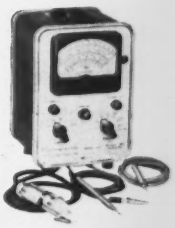

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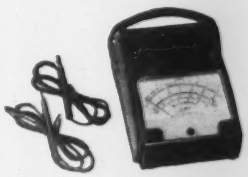
MODEL 1600—Accurately indicates AC voltages from .05 to 300 volts in frequencies from 20 cps to 700 mc (useable to 3000 mc). Includes special thermionic diode probe. Plus or minus DC volts, excellent readability from .05 to 1000 volts. 7-range ohmmeter with practical readability from 0.2 ohm to 1000 megohms. Power supply built-in. Has 1% meter.



SMALL SIZE VOM
MODEL 456—Has full-wave bridge type rectifier circuit. Features a patented automatic (button-reset) overload protection system to hold meter and associated circuits from damage due to accidental overload. 0-1200 AC or DC volts in 6 ranges. Sensitivity—20,000 ohms per volt DC (1000 AC). Resistance—0 to 100 megohms. 5 db ranges (−18 to +57).

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True RMS-VTVM—300 microvolts to 300 volts, 5 cps to 500 kc.

Stroboscopes—3 models with wide ranges.

Sound Level Indicators—Portable and laboratory types.

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Accurate DC and AC Portables

Ammeters, milliammeters, microammeters, voltmeters, millivoltmeters, volt-ammeters, thermometers. Shielded. Accuracy within ½ of 1%—available to 2/10 of 1%.

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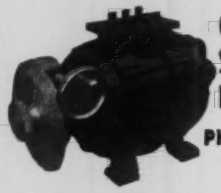

Quick
Safe
Economical

Phase Shifter
Type R

Made in 50 to 2500 volt ampere capacities. Provides means for shifting phase continuously for every possible angular displacement. May be obtained as combination of phase shifter and induction regulator.

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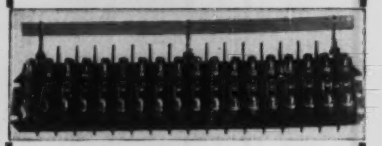

TYPE "NT" TERMINAL BLOCK

Sliding link feature. Any number poles desired. Test any circuit without removing permanent wiring.

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MODEL 200AB

PRICE $419.00

- 2° absolute accuracy
- Readings not affected by noise and harmonics
- Frequency range 15 CPS — 30KC
- Accuracy to .01 degree with simple circuit techniques
- High sensitivity on input & reference channels
- Can measure in-phase & quadrature voltage component

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Magnetic Research Corp
Rixon Electronics
Varo Mfg Co

MULTIPLIERS, including High Voltage
British Industries
Davenport Mfg
Donner Scientific
Electronic Associates
Federal Pacific
General Devices
Manson Labs
Peschel Electronics
Phoenix Precision Instr
Reeves Instr Corp
Sensitive Research Instr
Weston Instruments
Wiancko Engrg Co

NETWORK ANALYZERS, Electric, Match ng, Pulse Forming
ACDC Electronics Inc
Andersen Labs
Clegg Labs
Daven Co
Model Engrg
Rixon Electronics
Stelma Inc

NOISE FILTERS (see also Filters—Cat. 8)
Aerovox Corp
Airborne Accessories
Allen Business Machines
All-Tronics Inc
Bulova Research
Chicago Std Transformer
Globe Industries
Gudeman Co
Hughes Products
Intercontinental Elx
Kavamil Co
Kay Electric
Magnasync Mfg Co
North Hills Electric
Nuclear Chicago
Pacific Instrument Co
Packard Bell
Philco Corp
Rixon Electronics
Scott Inc H H
Sorensen & Co
Spectrum Instruments
Spencer-Kennedy Labs
Standard Electronics
Tobe Deutschmann Corp
United Transformer

NULL DETECTORS, Electrical
Acromag Inc
Beede Electrical Instr
Bergen Labs Inc
Boonton Electronics
British Industries
Bulova Research
Computer Instruments
Donner Scientific
Electro-Measurements
Federal Pacific
Fluke Mfg Co
Freed Transformer
General Radio
Hewlett-Packard
Houston Instrument
Hydel Inc
Industrial Test Equip
Leeds & Northrup
Measurements Research
M-H Boston Div
M-H Brown Instrs Div
M-H Marion Instr Div
Muirhead Instrs Inc
Scott Inc H H
Shallcross Mfg Co
Telecomputing Corp
Weinschel Engrg
Weston Instruments
Winslow Company Inc

OSCILLATORS, Audio-frequency, Miscrowave, Radio-frequency, Ultrasonic
Acoustica Assoc
Airtronics Inc
Alfred Electronics
Allied Radio
Amerac Inc
Applied Radiation Corp
Arenberg Ultrasonic
Biddle Co James G
British Industries
Bulova Research
Calif Technical Indus
Canadian Marconi
Carol Electronics
Citreo Ultrasonic
Clegg Labs
Collins Radio
Communication Accessories
Delta Inc
DI/An Controls
Donner Scientific
Dukane Corp
Dynatronics Inc
Electro-Mechanical Res
General Controls
General Devices
General Radio
Geotechnical Corp
Gertsch Scientific Inst
Hermes Electronics
Hewlett-Packard
Industrial Test Equip
Instrument Laboratories
Interelectronics
Kay Electric
Laboratory For Electronics
Leach Cor, oration
Manson Labs
Marconi Instruments
Midwestern Instrs
Muirhead Instrs Inc
Nati Ultrasonic
P and H Electronics
Philamon Labs Inc
Reeves-Hoffman Div
Riverbank Labs
Rixon Electronics
Sierra Electronic Corp
Solid State Electronics
Southwestern Indus Elx
Spectrum Instruments
Systron Corp
Technitrol Engrg
Telerad Mfg Corp
Teletronics Lab
Tel-Instrument Elx
Telonic Industries
Thomas Engrg Inc
Times Facsimile
Valpey Crystal Corp
Walkirt Co
Weinschel Engrg
Westamp Inc

OSCILLOGRAPHS, Moving-conductor
Century Elx & Instrs
Offner Electronics Inc

OSCILLOGRAPHS, Multi-element
Allegany Instrument
Brush Instruments Div
Century Elx & Instrs
Consol Electrodynamics
GE Apparatus Sales Div
Geotechnical Corp
Hamilton Watch Co
Hathaway Instrument Div
Midwestern Instrs
M-H Helland Div
Offner Electronics Inc

OSCILLOGRAPHS, Recording
Allegany Instrument
Applied Science Corp
Brush Instruments Div
Century Elx & Instrs
Consol Electrodynamics
Crump Instrument
Electro-Medical Lab
Epic Inc
GE Apparatus Sales Div
Geotechnical Corp
Gerber Scientific Inst
Hughes Products
M-H Helland Div
Gordon Enterprises
Hamilton Watch Co
Hathaway Instrument Div
Hughes Products
Massa Div
Midwestern Instrs
Moseley Co F L
Offner Electronics Inc
Sanborn Company
Southwestern Indus Elx

OSCILLOSCOPES
Allied Radio
American Electronic Labs
Canadian Marconi
Carol Electronics
DuMont Labs Allen B
Electro Instruments
Electronic Instrument
Electronic Tube
Feiler Engrg & Mfg
Hewlett-Packard
Hickok Electrical Instr
Hughes Products
Kingston Industries
Lavoie Labs
Marconi Instruments
Model Engrg
Railway Communications
Rohde & Schwarz
Scopes Company
Sierra Electronic Corp
Simpson Electric
Southwestern Indus Elx
Tektronix Inc
Trad Electronics
Triplett Electl Instr
Universal Match
Waterman Products

PERMEAMETERS, Magnetic
M-H Rubicon Instrs Div
Sensitive Research Instr
Sunshine Scientific

PHASE ANGLE INDICATORS
Acton Laboratories
Assembly Products Inc
Bowmar Instrument
Eastern Specialty Co
GE Apparatus Sales Div
Industrial Test Equip
Model Engrg
Muirhead Instrs Inc
North Atlantic Indus
Ohio Semiconductors
Sanborn Company
Systron Corp
Telechrome Mfg Corp
Theta Instrument
Western Electronic Prods
Weston Instruments

PHASE CONTROLLERS
Acton Laboratories
Electric Regulator
Fairfield Engrg
Hoffman Electronics
Rixon Electronics

PHASE SEQUENCE INDICATORS
Associated Research
Brunswick Instruments
Davenport Mfg
Eastern Specialty Co
Electric Regulator
GE Apparatus Sales Div
Knopp Inc
Master Specialties
Model Engrg
Opad Electric
Stieht Co Herman
United Mfg Co Div
Weston Instruments

PHASE SHIFTERS
Acton Laboratories
Aeronaut & Instr Div
Amer Meas & Control
Bogart Mfg Corp
Diamond Antenna
Diehl Mfg Co
Electronics International
Fairfield Engrg
Industrial Test Equip
Kearfott Microwave Div
Knopp Inc
Multi-Amp Electronic
Rantec Corp
Reeves Instr Corp
Rixon Electronics
States Company
Theta Instrument
Vectrol Engrg
Westinghouse Electric

POLARITY INDICATORS
Dice Co J W
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POTENTIOMETERS, Manually-balanced
Aerovox Corp
Allegany Instrument
Beckman/Helipot Div
Borg Equipment Div
Bourns Inc
Carter Mfg
Clarostat Mfg
Electric Regulator
Electro-Measurements
Fairchild Controls
Fluke Mfg Co
Gray Instrument
Julie Research Labs
Kintronic Div
Leeds & Northrup
Mallory & Co P R
M-H Rubicon Instrs Div
Model Engrg
Physics Research Labs
Precision Line Inc
Rinco Inc
Sensitive Research Instr
Servonic Instruments
Specialties Inc
Technique Associates
Thermo Electric
Weston Instruments
Winslow Company Inc

POTENTIOMETERS, Self-balanc.ng, Automatic Control, Indicating and/or Recording
Bailey Meter Co
Barber-Colman
Beckman/Helipot Div
Bristol Co
Centralab Div
Electric Regulator
Epic Inc
Foxboro Company
GE Apparatus Sales Div
Giannini Controls Corp
Gilmore Industries
Gulton Industries
Hays Corporation
Houston Instrument
InstruLab Inc
Leeds & Northrup
M-H Brown Instrs Div
Model Engrg
North Atlantic Indus
Servonic Instruments
Thermo Electric
West Instrument
Weston Instruments
Westronics Inc

POWER FACTOR INSTRUMENTS
Acton Laboratories
Epic Inc
Esterline-Angus
Federal Pacific
Fluke Mfg Co
GE Apparatus Sales Div
General Radio
Industrial Test Equip
Martindale Electric
North Atlantic Indus
Physics Research Labs
Sensitive Research Instr
Western Electronic Prods
Westinghouse Electric
Weston Instruments

POWER SUPPLIES, AC, DC, High Voltage, Regulated
ACDC Electronics Inc
Advanced Research
Aerovox Corp
Airborne Accessories
Air-O-Tronics Engrg
Alfred Electronics
Allied Radio
Allis-Chalmers
Ameleo Inc
Amplifier Corp of Amer
Applied Radiation Corp
Armour Corp
Associated Research
Associated Specialties
Bethlman Engineering
Beva Laboratory
Brach Mfg Corp
Bracke-Seib X-Ray
Carruthers & Fernandez
Chicago Std Transformer
Clegg Labs
Control Panel Corp
Communication Meas Lab
Cook Co Frank R
Cooper Development
Curtiss Wright
D & R Ltd
Daven Co
Davenport Mfg
Del Electronics
DJECO
Donner Scientific
Douglas Radio Labs
Dressen-Barnes
Dukane Corp
Dynatronics Inc
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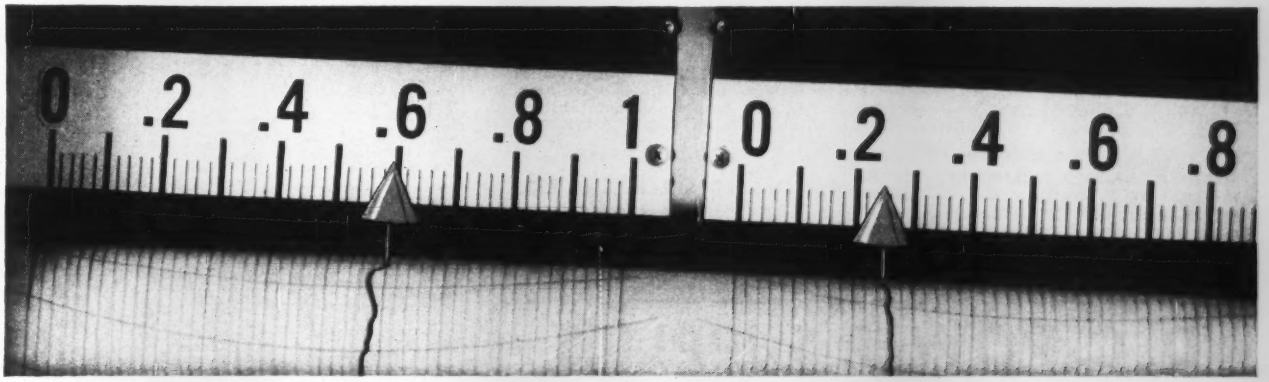
Elcor Div
Elcor Inc
Electric Eye Equip
Electric Regulator
Electron Arc
Electronic Instrument
Electronic Measurements
Electronic Tube
Electronics International
Electrosolids Corp
Fairfield Engrg
Film Capacitors Inc
Fluke Mfg Co
Freed Transformer
Gates Electronic
General Devices
GE Apparatus Sales Div
General Radio
Goslin Electric
Green Rectifier
Gulton Industries
Hamner Electronics
Hewlett-Packard
Hewson Co Inc
Industrial Instruments
Industrial Rectifier
Industrial Test Equip
Interelectronics
Julie Research Labs
Kahn & Co

plots twin records . . .



This new General Electric Type CH-37 duplex recorder plots two complete electrical records side by side on one ten-inch-wide chart. No more reading separate charts . . . now related functions such as watts and vars, volts and frequency, d-c amperes and speed can be measured and recorded with 1% accuracy on ***one strip chart.*** The CH-37 saves valuable panel space . . . it's only 15 inches wide by $16\frac{1}{16}$ inches high and semi-flush mounted. It features ***throw-away inkwell,*** multiple chart speeds, chart supply indicator, fluorescent-lighted chart face and gasket-sealed door with key lock. Companion models include a new narrow-range CH frequency recorder, self-contained and with accuracy of ±.05 cycles and range of only 58–62 cycles . . . and the CH-7 hook-on volt-ammeter, for accurate recording of dip and peaks on exacting maintenance jobs. Get the complete story on General Electric's line of CH recorders. Just call your nearby G-E Apparatus Sales Engineer or write direct to Section 592–201, General Electric Company, Schenectady 5, N. Y.

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ELECTRONICALLY REGULATED D. C. CONSTANT VOLTAGE POWER SUPPLIES

The output voltage is continuously variable from 200 to 325 volts D.C. for load currents of 0 to 100 M.A. with an input voltage of 105 to 125 volts 60 cycle. Regulation is better than 1%. An isolated A.C. voltage of 6.3 volts at 3 amperes is available at the output terminal connections.

MODEL 3 ILLUSTRATED

MODEL 3 CAB. MTG., VOLTMETER	$69.50
MODEL 1 RELAY RACK MTG.	$52.50
MODEL 2 SUB-CHASSIS MTG.	$49.50
DUAL RACK MOUNT FOR MODEL 2 Mounts Two Model 2 Units in 8¾"	$9.00

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1751 MAIN STREET
OREFIELD, PENNSYLVANIA

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CUSTOM DESIGNS

In Leading Laboratories Everywhere
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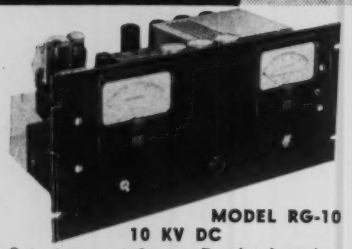
CIRCLE 198 ON READER-SERVICE CARD

SPELLMAN HIGH VOLTAGE POWER SUPPLIES



MODEL RG-10
10 KV DC

Output current 2 ma.—Regulated against line and load 1%. Variable 8 to 12 KV. Complete with Current and Volt Meters .....$260 Net

MODEL RG-5, 5 KV DC

Output current 2 ma. Regulated against line and load 1%. Variable 4 to 6 KV. Complete with Current and Volt Meters .....$250 Net

MODEL RG-15, 15 KV DC

Output current 2 ma. Regulated against line and load 1%. Variable 13 to 17 KV. Complete with Current and Volt Meters .....$275 Net
DIMENSIONS: Panel Height 8¾", Width 19", Depth 11".

MODEL LAB-90
0-90 KV RF TYPE REGULATED DC POWER SUPPLY

Continuously variable 0 to 90 KV DC Power Supply. Output current .7 ma. at 90 KV. 1 ma. at 80 KV. 2 ma. from 40 KV down. Voltage regulations better than 1% throughout entire range. Dimensions in cabinet: 28" high x 21¾" wide x 18" deep. For rack mounting. Panel dimensions 19" wide x 26" high x 18" deep.
LAB-90 Complete with HV meter .....$900.00 Net
Specify polarity output—positive or negative.

MODEL 4575
5 KV POWER SUPPLY

For an output voltage of 5 KV DC at 1 milliampere, the low voltage input requirement is 250 V at 50 milliamperes. By varying the DC input the output voltage can be varied from approx. 1 KV to 7½ KV. Dimensions: 5⅝" high x 5" deep x 4¼" wide. In completely enclosed metal housing. .....$32.50 Net
Model 4575-2 Same as above with 2 ma. output at 5 KV. .....$42.50 Net
FOR REVERSIBLE POLARITY MODELS (floating secondary) add letters PN after number. .....$10.00 additional

SPELLMAN HIGH VOLTAGE CO.
FORMERLY SPELLMAN TELEVISION CO., INC.
3029 WEBSTER AVE.
BRONX, 67, N. Y.
Kingsbridge 7-0306

CIRCLE 199 ON READER-SERVICE CARD

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Power Designs
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Reflectone Corp
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Stelma Inc
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Tech Apparatus Bldrs
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Tel-Instrument Elx
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Virginia Electronics
Western Apparatus Co
Western Design
Westinghouse Director Sys
Wheeler Electronic
Wiancko Engrg Co

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Allied Radio
Amplifier Corp of Amer
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Arenberg Ultrasonic
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Bulova Research
Chesapeake Instr
Collins Radio
Cubic Corp
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Electronic Tube
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Epsco Inc
Geotechnical Corp
Hanmer Electronics
Instrument Corp of Fla
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Midwestern Instrs
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Waber Electronics
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PROBES, High Voltage, High Frequency

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Demornay Bonardi
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Giannini Controls Corp
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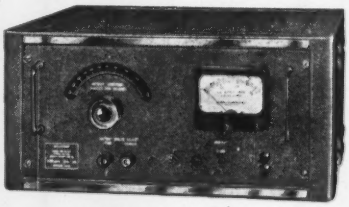

For research and development, production, test consoles or wherever A.C. Power other than the 60 cycle line is required. Models from milliwatts to kilowatts, subsonic to supersonic frequencies (variable or fixed), single or multiphase output.

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"TECHNICAL APPARATUS BUILDERS"

AC & DC POWER HEADQUARTERS!
TABTRON®—TABPAK®—TABTRAN®—TABSTAT®
High Current Power Supplies
Five Year Guarantee**
Variable Stepless from Zero to Full Voltage DC
Full Wave Selenium or Silicon Rectifier,
Isolation Power Transformer, Variac, Meters
*** Per Factory Warrantee* — *Write Details*

Stock # Volts & Amps	Continuous Rating	With Meters
T9V500A3ø SJ	0-9 VDC @ 500 Amp/4% Rip	$630
T612V12A*	0-8 or 0-16 VDC @ 12 Amps.	$37
T612V12ACC*	0-16 V @ 12 A ½% Rip @ 5 A	$47
T12V25ACC	0-12 V @ 25 A/5% Rip	$150
T12V50ACSJ	0-12 V @ 50 A/5% Rip/5% Reg	$225
T28V5A	0-28 WVDC @ 5 Amp	$57
T28V5ACC	Filtered (1% Ripple)	$84
T28V12A	0-28 WVDC at 12 Amp	$135
T28V12ACC	Filtered (1% Ripple)	$168
T28V12A2CC	Filtered (0.1% Ripple)	$223
T28V24A	0-28 WVDC at 24 Amp	$165
T28V24ACC	Filtered (1% Ripple)	$224
T28V50A	0-28 WVDC at 50 Amp	$306
T28V50ACC	Filtered (2% Ripple)	$400
RT35V5ACCSJ	0-35 V @ 5 A/1% Rip/± 5% Reg	$160
RT35V12ACCSJ	0-35 V @ 12 A/1% Rip/± 5% Reg	$250
RT35V25ACCSJ	0-35 V @ 25 A/1% Rip/± 5% Reg	$395
RT35V50A3ø SJ	0-35 V @ 50 A/2% R/± 5% Reg	$540
RT35V100A3ø SJ	0-35 V @ 100 A/2% R/± 5% Reg	$756
T130V5A	0-130 VDC @ 5 Amp	$225
T130V5ACC	Filtered (1% Ripple)	$275
T220V5ACC	0-220 V @ 2 Amp/2% Rip	$270

*2" Meters: SJ/SILICON RECT; 3ø/208-230 VAC/3ø / INPT

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B24V4AR	24-28 VDC @ 1 Amp	$7.00
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Lo-Priced Basic DC Power Packages Isolation Transformer, Rectifier, Switch, Fuse 5 Way Terminals!

B5V500A3ø	$522	B28V24A	$139
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B28V12A	$90	B220V2A	$150

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To Your Specs — All Types & Current Ranges!
Ratings Are for Continuous Duty & Convection Cooling

"SILTAB" ® SILICON 150°C FINNED RECTIFIERS—CONVECTION COOLED! FULL WAVE BRIDGE — F.W. CENTER TAP

MAX DC AMP	36VAC 32VDC	70VAC 62VDC	120VAC 125VDC	240VAC 250VDC	1400VAC 1250VDC	1960VCT 875VDC
1	54.20	5.45	$6.15	$7.90	$37.90	$36.00
2	5.30	6.75	7.60	9.30		
3	7.60	15.40	17.10	20.80		
6	9.75	27.00	24.90	35.00		
10	19.90	33.60	28.45	40.75		
12	22.00	51.75	33.45	47.15		
24	32.00	77.75	84.15	110.30		
50	84.15	110.30	130.60	174.70		
100	95.45	136.75	180.30	321.90		
150	149.00	170.00	306.00	350.00		
200	241.00	261.00	495.00	561.00		
400				1000		

"TEKSEL" ® SELENIUM RECTIFIERS, ONE YEAR GUARANTEED! CONVECTION COOLED*

DC AMP	18VAC 14VDC	36VAC 28VDC	54VAC 42VDC	72VAC 56VDC	144VAC 110VDC	266VAC 217VDC	FWCT 30VCT	Forced Air Cooling Increase Amp
1	51.40	52.30	53.45	54.50	58.75	516.00	12VDC	Rating 1 at 2X Amps.
2	2.10	2.35	2.55	2.75	3.00	4.80	2.60	*Silicon at 125°C.
6	3.65	7.35	11.40	16.85	24.85	47.60	4.70	Amps. for Capaci-
12	4.40	8.75	12.75	18.75	32.60	63.45	7.60	tive, Motor or Battery
20	8.00	15.75	21.95	30.95	45.00	103.60	9.45	Loads; Derate D.C.
40	12.90	25.30	37.45	49.50	78.75	169.00	12.75	Amps. Cur. by 20%
60	16.00	31.90	44.60	57.50	85.00	188.75	24.90	Write for Tech Data!
80	33.45	63.75	121.50	155.75	192.75	398.90	227.00	

"TABTRAN" UNIVERSAL RECTIFIER TRANSFORMERS Dsgnd for F.W.B., C.T. & H.W.

Sec'd Volts (DUAL): 0-9-15-18-& 0-9-15-18
Series Sec'ds 0-3-6-9-12-15-18-21-24-27-30-33-36 Volts.
Pri-115 VAC, *115 & 230 AC

TR4001 @	1 Amp per each Sec'd Windings	$4.75
TR4002 @	2 Amp per each Sec'd Windings	6.60
TR4003 @	5 Amp per each Sec'd Windings	8.70
TR4005 @	12 Amp per each Sec'd Windings	18.00
TR4006 @	24 Amp per each Sec'd Windings	33.75
TR4007* @	50 Amp per each Sec'd Windings	54.00
TR4008* @	100 Amp per each Sec'd Windings	106.00

† Wndgs. In Series at Amps Shown; Parallel Secds @ 2X Amps

"TABTRAN" UNIVERSAL RECTIFIER CHOKES

CR6001	1 Amp, 0.1 Henrys 1.4 Ohm	$3.75
CR6002	2 Amp, 0.1 Henrys .62 Ohm	5.60
CR6007	4 Amp, .01 Henrys .1 Ohm	5.95
CR6003	5 Amp, .07 Henrys .6 Ohm	9.45
CR6004	12 Amp, .01 Henrys 1 Ohm	14.45
CR6005	24 Amp, .004 Henrys .025 Ohm	27.00
CR6006	50 Amp, .001 Henrys .001 Ohm	40.00

"TABCAP"® FILTER CAPACITORS

CE156M	6000 MFD 15 V Wkg	$2 each
CE502M	2000 MFD 50 V Wkg	$4 each
CE2005M	500 MFD 200 V Wkg	$6 each
Brackets for capacitors		25c each

"TABTRAN" ISOLATION & CONTROL XFMRS
Enclosed Power Type Elec/Static-Shielded
Primary 115/230V & Secondary 115/230V 1ø 60 cys.
Also on SPECIAL ORDER 230/460V Specify!

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TPP100/100W	$14	TPP150/150W	$17
TPP250/250W	$22	TPP500/500W	$32
TPP750/750W	$40	TPP1000/1KW	$49
TPP2000/2KW	$73	TPP3000/3KW	$98

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CIRCLE 201 ON READER-SERVICE CARD

0-32 V.D.C. ½% Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

Amps.	Model	Style	H	W	D	Fig.
5	KM75	Rack	8¾"	19"	9½"	D
	KM75B	Bench	9"	17"	9"	E
10	KM81	Rack	8¾"	19"	9½"	D
	KM81B	Bench	9"	17"	9"	E
20	KM87	Rack	8¾"	19"	9½"	D
	KM87B	Bench	10½"	22"	12"	F
40	KM93	Rack	12¼"	19"	13"	—
	KM93B	Bench	14"	22"	15"	B

FEATURES

- Vacuum Varnish Impregnated Magnetic Components.
- 4½" Rectangular 2% Accuracy, D.C. Panel Meters (3½" on small units).
- Controls include power switch, line and load fuses, pilot light, voltage control knob, output binding posts.
- Voltage Regulation: 1/10 Load 36 Volts
  Full Load 32 Volts
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 102

0-32 V.D.C. 4% Ripple

Input: 208 V.A.C. 60 Cycles, 3 Phase

Amps.	Model	Style	H	W	D	Fig.
100	FR100	Floor	46"	22"	18"	A
200	FR200	Floor	46"	22"	24"	A

FEATURES

- Fully Self-Protecting Circuit.
- Pushbutton Operated Magnetic Contactor.
- Indicating Type AC Input Fuses.
- Adjustable Overcurrent Control in D.C. Circuit.
- Thermal Overload Device on Rectifier.
- Overload Warning Light and Reset Button.
- 4½" Rectangular, 2% Accuracy Panel Meters.
- Low Voltage Regulation: Approx. 8%
- Ball Bearing Type Casters.
- Input Receptacle and Mating Plug.
- All receptacles, terminals and controls clearly designated.
- Budget Priced.

Bulletin No. 155

0-110 V.D.C. 1% Ripple

Input: 115 V.A.C. 60 Cycles, Single Phase

Amps.	Model	Style	H	W	D	Fig.
2.5	RS10	Rack	8¾"	19"	9½"	D
	RS10B	Bench	10½"	22"	12"	F
5	RS20	Rack	10½"	19"	13"	D
	RS20B	Bench	12¼"	22"	15"	F
10	RS30	Rack	12¼"	19"	13"	—
	RS30B	Bench	14"	22"	15"	B
20	RS40	Rack	17½"	19"	13"	—
	RS40B	Bench	19¼"	19"	15"	C

FEATURES

- Vacuum Varnish Impregnated Magnetic Components.
- Non-Aging Rectifiers (Germanium or Silicon).
- 4½" Rectangular 2% Accuracy D.C. Panel Meters (3½" on small units).
- Controls include Power Switch, Line and Load Fuses, Pilot Light, Voltage Control Knob and Output Binding Posts.
- Both D.C. Terminals above ground and isolated from A.C. Line.
- Panel Type Carrying Handles.
- Convection Cooled Continuous Duty Ratings.

Bulletin No. 204

TRANSISTOR REGULATED POWER SUPPLIES

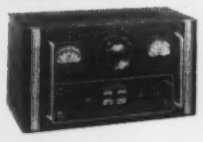
3-32 Volts D.C. ±½% Regulation*
Input: 105-125 volts A.C., 60-400 cycles, Single phase

Amps.	Model	Style	Amps.	Model	Style
1	TR10	Rack	10	TR30	Rack
1	TR10B	Bench	10	TR30B	Bench
5	TR20	Rack	15	TR40	Rack
5	TR20B	Bench	15	TR40B	Bench

FEATURES

- Zener Diode Reference.
- Ripple less than 5 M.V.
- Vacuum varnish impregnated magnetic components.
- Short Circuit Protection.
- Controls include power switch, fuses, pilot light, voltage control knob and output binding posts.
- 2% Accuracy Panel Meters.
- Both output terminals above ground and isolated from A.C. line.
- Panel type carrying handles.
- Continuous duty ratings.
- High efficiency.

*Line and Load



GENERAL PURPOSE UNITS

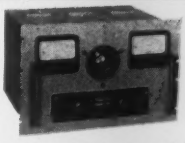
OUTPUT: 0-30 Volts D.C. Unfiltered Full Wave.

INPUT: 115 V.A.C., 60 Cy., 1 ϕ.

Model GM72 5 Amperes
Model GM78 10 Amperes
Model GM84 20 Amperes
Model GM90 50 Amperes

FEATURES: 2% accuracy Panel Meters, Line and Load Fuses, Switch, Pilot Light, Binding Posts.

Bulletin No. 179



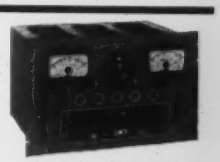
AIRCRAFT BATTERY SUBSTITUTE

OUTPUT: 0-30 V.D.C., 20 Amperes.
RIPPLE: Less than 1%.
INPUT: 115 V.A.C., 60 Cy., 1ϕ.
REGULATION: 1/10 Load 35 Volts
Full Load 30 Volts

FEATURES: Ammeter overcurrent protection circuit prevents needle 'slam' when starting inverters & motors

MODEL KM88 ...Rack Mount
MODEL KM88B...Bench

Bulletin No. 100



DUAL RANGE POWER SUPPLY

OUTPUT: 0-32/64 V.D.C., 40/20 Amps.

RIPPLE: Within 1% of aver. DC.
INPUT: 115 V.A.C., 60 Cy., 1 ϕ.

FEATURES: Thermal overload protection, indicating line and load fuses, overload warning light, dual range voltmeter.

MODEL KM95 ...Rack Mount
MODEL KM95B...Bench

Bulletin No. 103

OPAD ELECTRIC COMPANY
43-20 WALKER STREET • NEW YORK 13, N. Y.
Telephone WOrth 6-0380

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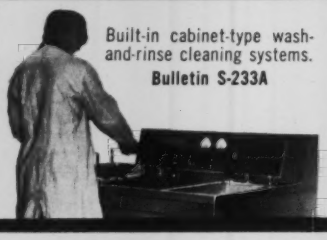
Bulletin S-509, S-217B



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Julie Research Labs
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Dice Co J W
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Electronic Instrument
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Physics Research Labs
Rinco Inc
Winslow Company Inc

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Clarostat Mfg
Corbett Science Labs
Daven Co
Electro Instruments
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General Radio
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Ram Meter Inc
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Shallcross Mfg Co
Simpson Electric
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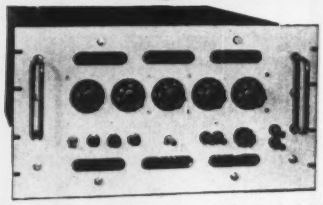
NORTH HILLS'



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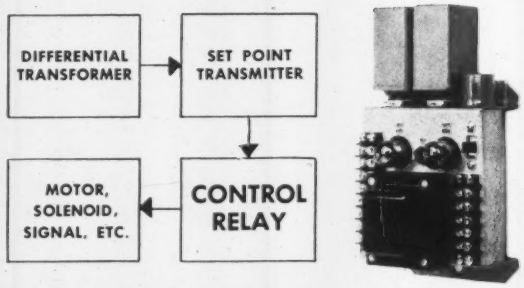
ATCOTRAN CONTROL RELAY



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MILLI-V-METER*

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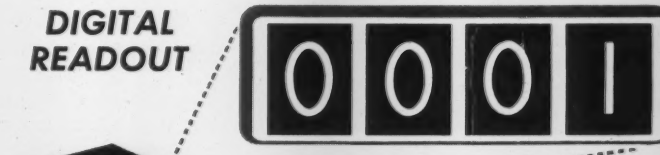

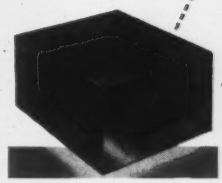

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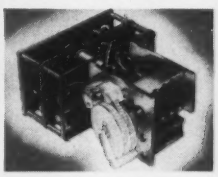
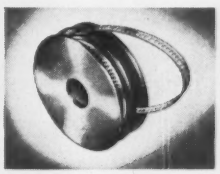


***ALL INCLUSIVE** — With Zener reference, power supply, amplifier, servo motor, 144" tape-slidewire.*



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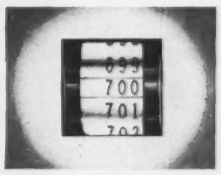

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Ameleo Inc
Amplifier Corp of Amer
Brach Mfg Corp
British Industries
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Power Designs
Sola Electric
Sorensen & Co
Sterling Transformer
Superior Electric Co
Tech Apparatus Bldrs
Technique Associates
Tel-Instrument Elx
Valor Instruments
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Greibach Instrument
Hickok Electrical Instr
Physics Research Labs
Q V S Inc
Sangamo Electric Co
Schauer Mfg Corp
Sensitive Research Instr
Simpson Electric
Sunshine Scientific
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Waldom Electronics
Welch Scientific
Westberg Mfg Co
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VOLT-AMPERE-HOUR METERS
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VOLT-AMPERE METERS, Reactive
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Allied Radio
Assembly Products Inc
Beckman/Helipot Div
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Burton-Rogers
Cubic Corp
Dejur Amsco
Electric Des & Mfg
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Fluke Mfg Co
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Greibach Instrument
Hickok Electrical Instr
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Parker Electronics
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Q V S Inc
Rawson Electrical
Sensitive Research Instr
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VOLTMETERS, Electro-Static
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Sticht Co Herman
Sunshine Scientific
WacLine Inc

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Burton-Rodgers
Columbia Electric
Computer Equipment
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by C. S. Beard. New "one-book" reference on control valves . . . covers flow characteristics; mechanical features; valve capacity; sizing; body types; positioners; actuators, including d-c, electrohydraulic and gas hydraulic actuators. Numerous tables and illustrations. Paperbound, 236 pages, 1957. **$2.00**

Regulators and Relief Valves

by Chester S. Beard and Fred D. Marton. Covers regulators for pressure, vacuum, flow, temperature, level, gas systems, and pump discharge. Also safety, relief, and safety-relief valves; and automatic emergency valves, including shut-off valves for oil and gas transmission lines. Paper, 204 pages, illustrated, 1959. **$2.00**

Strain Gage Instrumentation

edited by Aronson and Nelson. " . . . a practical text . . . covers fundamentals, basic bridge circuits, typical applications, and surveys typical commercial instruments which use or are used with strain gages." Paper, 110 pages, illustrated, indexed by company, author, and subject, 1958. **$2.00**

INSTRUMENTS PUBLISHING CO.
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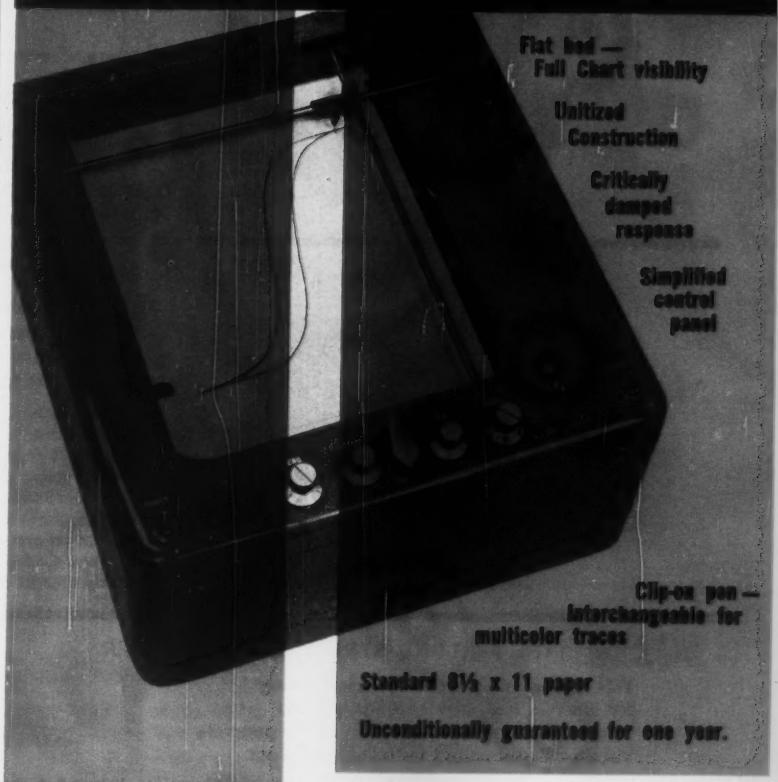
HR-92 X-Y RECORDER


Flat bed — Full Chart visibility
Unitized Construction
Critically damped response
Simplified control panel
Clip-on pen — interchangeable for multicolor traces
Standard 8½ x 11 paper
Unconditionally guaranteed for one year.

RUGGED "All Purpose" X-Y RECORDER

The HR-92 is a null-seeking servo-type plotter designed to draw curves in Cartesian coordinates on regular 8½ x 11 graph paper. It employs conventional chopper amplifiers, 2-phase motors and a potentiometer rebalance. Reference voltages are furnished by mercury cells. Control panel has zero set and continuously-variable attenuator for each axis. Separate standby and power switches are provided. The two axes are electrically and mechanically independent. By moving an internal jumper lead, a high impedance potentiometer input can be made available.

SPECIAL FEATURES:

- Amplifiers easily removed if servicing ever becomes necessary. Electrical connections all contained in two plugs for each amplifier.
- Each amplifier channel (including transformer power supply) independent of rest of system.

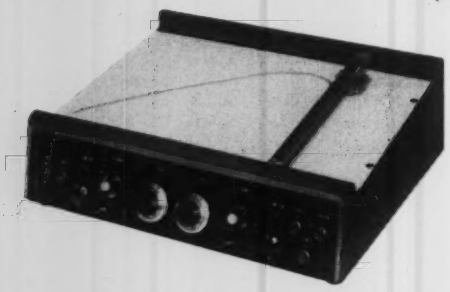
WRITE FOR:
New X-Y Recorder Circular #717-3 showing complete specifications and photographs.

houston instrument corporation
1717 Clay Avenue · Houston 3, Texas
CA 5-6964

CIRCLE 208 ON READER-SERVICE CARD

MOSELEY AUTOGRAF

N E W MODEL 2D X-Y RECORDER



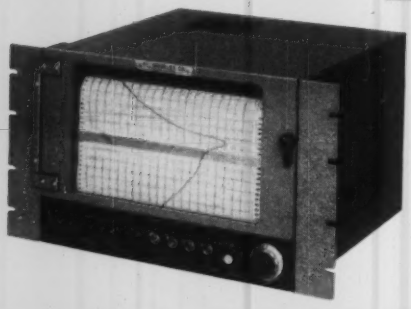
Integral AC/DC input
No extra AC converter needed
Built-in sweep circuit
Popular 11" x 17" size

with accessories including

Digital Character Printer, Curve Follower, Continuous-Roll Transport, "Tear-off" Chart Transport.

New Model 2D X-Y Recorder has an input range of 7.5 mv to 150 v on X-axis; 5 mv to 100 v on Y-axis; each in 10 steps. Input resistance 200,000 ohms/v; zero offset; accuracy and resolution of ± .2%. X-axis time base, 5 steps, 7.5 to 750 secs. Pen speed 20 in/sec; vacuum paper hold down. Variable range extender both axes.

N E W MODEL 80 STRIP-CHART RECORDER



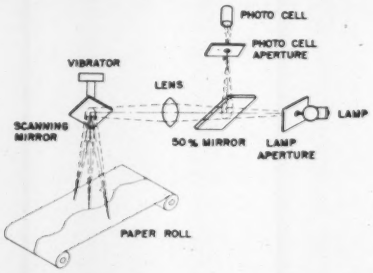
6 push-button variable chart speeds
Transistor speed switching; no gears
Local or remote chart and pen control
Roll-out carriage simplifies chart change

New precision laboratory strip-chart recorder providing instantaneous control of all functions; employing standard 120′ chart rolls. Input ranges 5 mv to 100 v, with 10 calibrated steps plus continuous vernier span control. Full range zero set; input resistance 200,000 ohms/v through 10 v; 2 megohms on higher ranges. Sensitivity 0.05% full scale, resolution and accuracy 0.2%. Pen speed (max.) ¼ second full scale, chart speeds 2, 4, 6, 8, 15 and 60 in/min; other speed groups available.

N E W TYPE F-2 LONG STRIP CURVE FOLLOWER

Tracks, converts trace to electrical energy
No metallic inks or re-drawing required
Unique photoelectric-oscillating mirror principle
Permits digital output for tapes, cards, etc.

This new-approach instrument eliminates tedious re-tracing of flat charts with metallic inks, and makes possible swift reconversion to electrical output of any trace on continuous roll charts. Oscillating mirror-photocell design uses advanced optics to sweep, sense and convert any trace to electric energy. Model F-2 is also a complete Strip-Chart Recorder, offering features of Model 80 above.



N E W MODEL 42 DIGITAL TRANSLATOR

Permits cartesian plotting of digital data
Accepts keyboard, card, perforated or magnetic tape inputs
High-speed transistorized control circuits
Accepts 4 digits and sign per axis; front panel matrix contents display

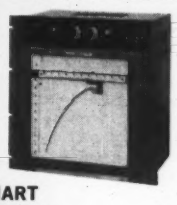
Model 42 accepts digital data, presents analog output plus control signals for automatic operation of Moseley X-Y Recorders. Accuracy of analog-digital conversion 0.1%. Compatible with IBM Summary Punches and Card Readers including Models 514, 519, 523, 524, 526, etc. May be driven, without modification, by mechanical punched tape readers or motorized readers; also has 10-key serial keyboard for manual operation.

Accessories include Flexowriter converter, remote decimal contents readout panel, converter for optical or magnetic tape operation.

FIELD REPRESENTATIVES IN ALL PRINCIPAL AREAS

CIRCLE 209 ON READER-SERVICE CARD

X-Y RECORDERS, STRIP CHART RECORDER, ACCESSORIES

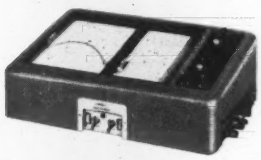


Model 6S, AUTOMATIC CHART ADVANCE AUTOGRAF

A rack mounting X-Y Recorder with a capacity of 120 complete 10" x 10" charts in a standard roll. Internal transport mechanism automatically and precisely positions new chart when desired. Used charts may be stored or torn off individually. Vacuum paper hold-down; sweep circuit operates on Y-axis.

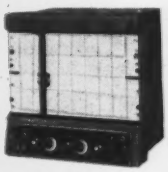
Model 2A and 2S AUTOGRAF

A flat-bed 11" x 17" X-Y Recorder for bench top use. Input facilities for point plotter, curve follower, tape or card translator. Internal vacuum system for paper hold-down. "T" square type recording mechanism with easily changeable ink pen. Model 2S includes sweep circuit on X-axis.



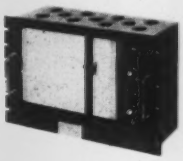
Model 3S AUTOGRAF

A flat-bed 8½" x 11" X-Y Recorder for tabletop use. Compact and lightweight, this instrument is ideal for general laboratory work. Independent servos drive "drafting machine" type pen mechanism without interaction. Model 3S includes sweep circuit on X-axis.



Model 4S and 4B AUTOGRAF

The model 4S is a rack mounting 11" x 17" X-Y Recorder with built-in facilities for data reduction and Curve Follower accessories. Model 4B is a two-pen X-Y Recorder for simultaneous plotting of two dependent variables. Each pen traverses full vertical scale. Both models include X-axis time base.

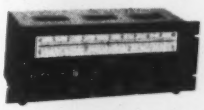


Model 5S and MR5 AUTOGRAF

A rack mounting version of the Model 3 AUTOGRAF, this 8½" x 11" X-Y Recorder occupies only 12¼ inches of vertical rack space making it desirable for use where a number of recorders are employed simultaneously. Model 5S includes a sweep circuit on the X-axis. Model MR5 is a militarized 400 cycle version of the Model 5, available on special order.

Model 1 AUTOGRAF

This completely portable 8½" x 11" X-Y Recorder is a preferred model for many uses. Drum type recording platen is compact and rugged. May be fitted with external Curve Follower. Removable cover protects operating mechanisms when transported.



Model 20 DC VOLTMETER

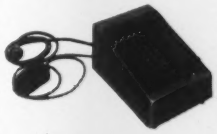
A high accuracy servo-actuated, multirange DC Voltmeter with large, easy to read, linear scale. Eleven voltage ranges: 3, 10, 30, 100, 300 millivolts and 1, 3, 10, 30, 100, 300 volts, full scale. Internal standard calibration cell. Input resistance 200,000 ohms/volt on all scales up to 30 volts; 60,000 ohms/volt on 100 volt scale; 20,000 ohms/volt on 300 volt scale. Zero left and zero center adjustment feature. 0.25% of full scale accuracy, all ranges.

Model 60B LOGARITHMIC CONVERTER

Converts DC or AC input voltages to DC voltages proportional to the logarithm of the positive peak amplitude of the input voltage. For use as a computer element or in gain-frequency plotting systems for recording characteristic curves of amplifiers or resonant devices. Better than 60 db dynamic range; 20 to 20,000 cps frequency range; normal operating speed 20 db per second; output ranges of 5, 10, and 20 db per inch; ± ½ db accuracy.

TYPE A-1 AC TO DC CONVERTER

An external unit to convert AC input voltages to DC voltages suitable for application to the axes of an Autograf X-Y Recorder. 20 cps to 100 KC frequency range; steps of 0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10, 20 volts per inch, each axis; calibrated in RMS for sinusoidal input; 2 megohms input resistance (shunted by less than 25 mmfd); linearity 0.1% to 20 KC, 0.3% to 100 KC; accuracy 0.5% to 20 KC, 2% to 100 KC.



Model 40A KEYBOARD

Full keyboard type for direct use with Model 2 or 4 series AUTOGRAF. Built-in regulated power supply furnishes voltage to resistor matrices associated with keys for each axis. Plots from zero to ± 1999 on each axis; ± 0.10% digital to analog conversion accuracy; special circuits for calibration, error detection, and selection of "hold" or automatic "clear" on each axis independently. Available in ten-key type, Model 41A.

GAIN-FREQUENCY PLOTTING SYSTEM

Consists of Model 3 AUTOGRAF X-Y Recorder, Model 60B Logarithmic Converter, and Model 207 AR Hewlett-Packard motor driven Audio Sweep Oscillator, all conveniently mounted for bench top use. Characteristic curves are produced automatically as rapidly and as often as desired by merely pushing an actuating button. Better than 60 db dynamic range with ± ½ db accuracy. 20 to 20,000 cps frequency range. Flexible inter-connecting method makes individual units available for separate use.

AUTOGRAF *recorders*

F. L. MOSELEY COMPANY
409 N. Fair Oaks Avenue, Pasadena, California
MUrray 1-0208 TWX PASA CAL 7687

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CIRCLE 209 ON READER-SERVICE CARD

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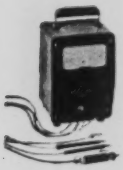
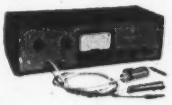
LABORATORY INSTRUMENTS OF EXCEPTIONAL PRECISION

VOLTAGE MEASUREMENT



TYPE 810-A VTVM — Balanced circuits and liberal inverse feedback to insure long-time stability and accuracy. 7 full scale DC ranges: 1-1000 volts; 6 AC ranges; 1-300 V (rms); 7 resistance ranges 0.2 to 500 with multipliers of x1-x1 meg. DC accuracy ±2%; AC accuracy ±3%. Frequency response ±1 db, 10 cps to 700 mc. 100 meg input impedance for DC measurement. High input impedance to 700 mc maintained by 1.2 mmf input capacitance of AC probe.

TYPE 815-A VTVM — Has wide ranges. 9 full scale DC ranges; 0.1-1,000 volts; 8 AC ranges: 0.1-300 volts (rms); 9 DC current ranges: 0.001 ua to 100 ma; 9 resistance ranges: 0.2 to 500 with multipliers x0.1 to x10 meg. DC accuracy ±2%, AC ±3%, both 1 V range and higher. Frequency response 15 cps to 100 MC. DC input impedance 100 meg; AC 5 mmf and 10 meg. Also available as 815-AR (rack mount — gray panel).



IMPEDANCE MEASUREMENT

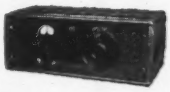
TYPE 310-B Z-ANGLE® METER — Measures in polar form the impedance, phase angle, dissipation factor, and storage coefficient of any RLC combination. One balancing control permits accurate analyses to be made more quickly and easily than with conventional AC bridges. Measures impedances from 0.5 to 100 k. Frequency range: 30 cps to 40 kc. Accuracy of impedance magnitude is ±1% to 20 kc and ±2 degrees for phase angle. Unit has internal 400 cps and 60 cps signals.

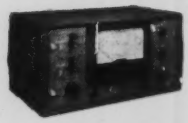
TYPE 314-A LOW-IMPEDANCE Z-ANGLE® METER — Measures low values of complex impedances in polar form. Direct readings of impedance in ohms, phase angle in degrees, and dissipation factor. Freq. range of 30-1000 cps, impedance-magnitude range of 0.005-1000 ohms accurate to ±1%, and dissipation-factor range of 0 to infinity. Phase angles measured from −90° to 0° to +90°, with accuracy of ±1°. 4-terminal arrangement nullifies effect of lead impedance and insures accurate measurements. Also available as 314-AR (rack mount).

PHASE MEASUREMENT AND GENERATION

TYPE 320-AB PHASE METER — Measures phase difference between 2 signals (1 cps to 100 kc) of any wave shape and indicates phase angle on large meter with separate ranges of 360°, 180°, 90°, and 36°. Accuracy is ±(1% of full scale + 3 degrees). Requires no adjustments, corrections, or balancing operations. Amplitude range is .7 to 120 volts rms. Input impedance of 10 meg and 13 mmf. Also available as 320-ABR (rack mount).

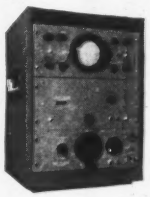
TYPE 709-A BROADBAND SECONDARY PHASE STANDARD — Calibrates phase measuring instruments and measures phase when used with oscilloscope. Develops 2 sinusoidal signals variable from 0° to 360° with respect to each other. Range is 20 cps to 20 kc. Accuracy of ±1° from 20 cps to 10 kc. High input impedance, low output impedance. Inherent distortion less than 1%. 0.5 to 5-volt output varies less than ±2% with phase shift. Also available as 709-AR (rack mount).





TYPE 328-A TRANSISTORIZED PHASE METER — Frequency range 10 cps to 50 kc. Direct reading from 0 to 360° in 6 ranges of 60° each on large 5" meter scale. Absolute accuracy of 1° from 10 cps to 10 kc. Amplitude range .25 to 170 volts peak except at low frequencies. Input impedance: one megohm shunted by 20 mmf. Internal output impedance is approx. 100,000 ohms. Recorder connector provided. Power: 105-125 volts, 60 cycle AC, 20 watts. Terminals provided for operating from an external 45 volt battery, 50 mil drain. Also available as 328-AR (rack mount).

TYPE 7000-B AUDIO PRIMARY PHASE STANDARD — Calibrates phase detectors and phase shifting devices but can also be used to measure phase shift. Supplies 2 sinusoidal signals of same frequency whose phase relationship is continuously variable from 0° to 360° with ±0.05° accuracy, set by Lissajous pattern. Any single frequency available from 30 cps to 20 kc. Output of 1 to 10 volts rms from impedance of approximately 200 ohms.



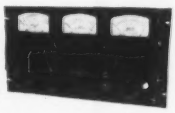
TYPE 706-A ULTRA-SONIC PRIMARY PHASE STANDARD — Calibrates high frequency phase meters, phase detectors, and phase-shifting devices. Generates 2 sine-wave signals having variable phase difference 0° to 360° at any specified single frequency 20 to 200 kc. Phase angle accuracy of ±0.1 degree set by observation of multiple frequency Lissajous pattern on built-in scope. Also available as 706-AR.

TYPE 511-A POWER AMPLIFIER — Low distortion, low noise and phase shift compensated amplifier for 50 cps to 50 kc range. Output load characteristics: 5 ohms 12.8 watts, 25 ohms 13 watts, 200 ohms 15 watts, 1200 ohms 12 watts, down 1 db at 50 kc. Phase compensation permits application as drive source for Type 7000-B. Also available as 511-AR (rack mount).

TRANSMISSION AND DELAY MEASURING SETS

Measures the absolute amplitude and relative delay characteristics of 600 ohm transmission circuits in the frequency range from 200 cycles to 24 kc. The instrument consists of two basic units: the 451-A Transmitter and the 452-A Receiver.

The instruments will operate 32°F to 130°F and with normal 60 cycle line voltages ranging from 105 to 125 volts. It has an overall precision and accuracy of ±50 microseconds and a drift rate not exceeding ±50 microseconds per 30 minutes.



POTENTIOMETER TESTING EQUIPMENT

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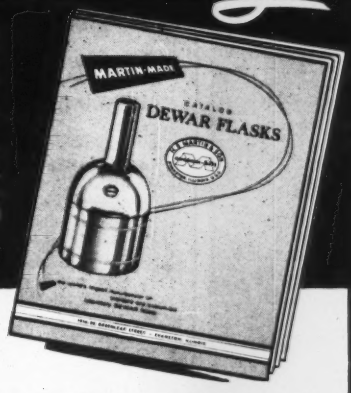

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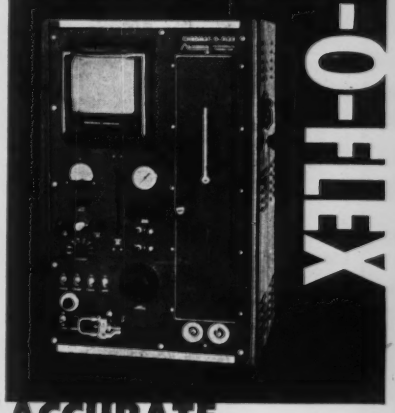

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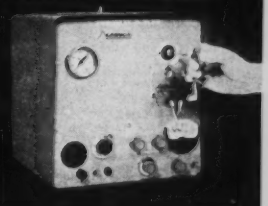

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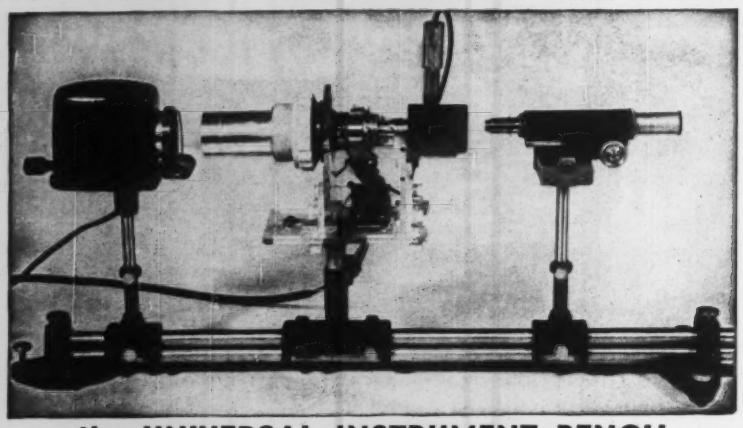

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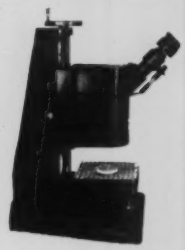

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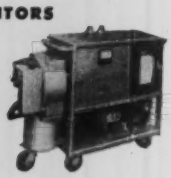

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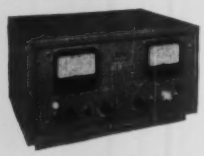

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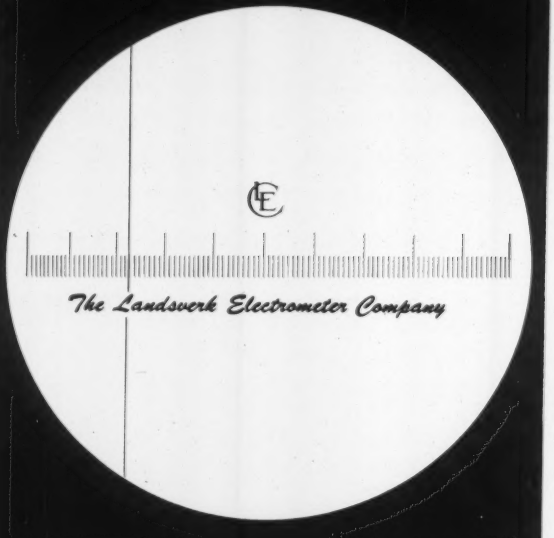

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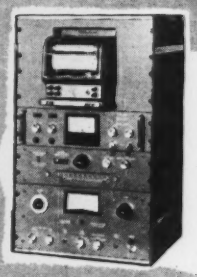

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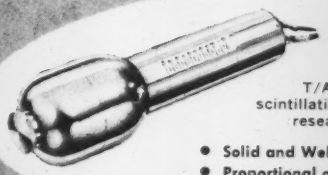

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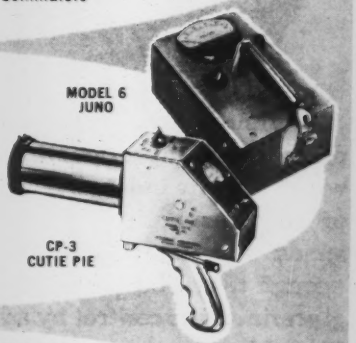

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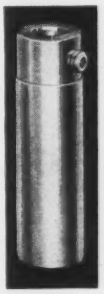

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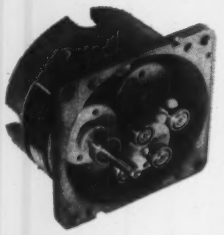

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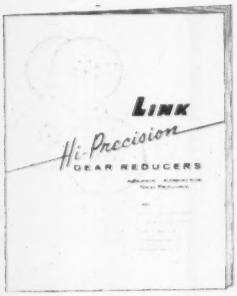

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Unitron Instrument
Zoomar Inc

THEODOLITES, Magnetic

Buff & Buff Mfg
Gurley W & L E
Librascope Inc

THEODOLITES, Pilot Balloon

Buff & Buff Mfg
Engis Equipment
Fecker Inc
Gordon Enterprises
Gurley W & L E
Librascope Inc

WIND TUNNEL INSTRUMENTS

Aero Research Instr
American Electronics Inc
Automatic Timing & Contls
Baldwin-Lima-Hamilton
Bytrex Corp
Consol Electrodynamics
Consolidated Systems
Curtiss-Wright IMI
Datex Corp
Dwyer Mfg F W
E & W Optical
Electro Instruments
Engis Equipment
Exactel Instrument
Flow Corporation
GPE Controls
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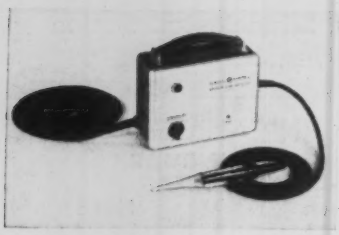
locates leaks in a flash . . .



This new General Electric Type H-6 leak detector flashes a probe light instantly when the tip pinpoints a leak. Air conditioning and refrigeration leaks (even as small as ½ ounce per year) are detected quickly and positively in a flash! ***Eliminates costly guess work.*** As soon as the tip of the probe finds a broken seam or leaky joint, there's a reliable signal right in your hand! The H-6 has an automatic balance circuit . . . you can locate leaks even when the atmosphere is contaminated with refrigerants up to 100 ppm. Flip the switch and start probing in only 60 seconds. This sensitive unit ***responds to leaks quickly,*** recovers in a second. It's compact, lightweight, rugged, portable . . . and attractively designed. Always enjoy fast, positive, sensitive detection—at low cost—with the Type H-6. Or, for other special applications, select from General Electric's complete line of portable and stationary halogen units for pressure or vacuum leak testing. Get the full story today! Just contact your local air conditioning and refrigeration wholesaler, or write direct to Sect. 595-203, General Electric Co., Schenectady 5, N. Y.

Other General Electric Instruments for Industry—*Hook-on volt-ammeters, electric recorders and controllers, pyrometers, timing devices, speed and color measurement equipment, laboratory test instruments.*

INSTRUMENT DEPARTMENT

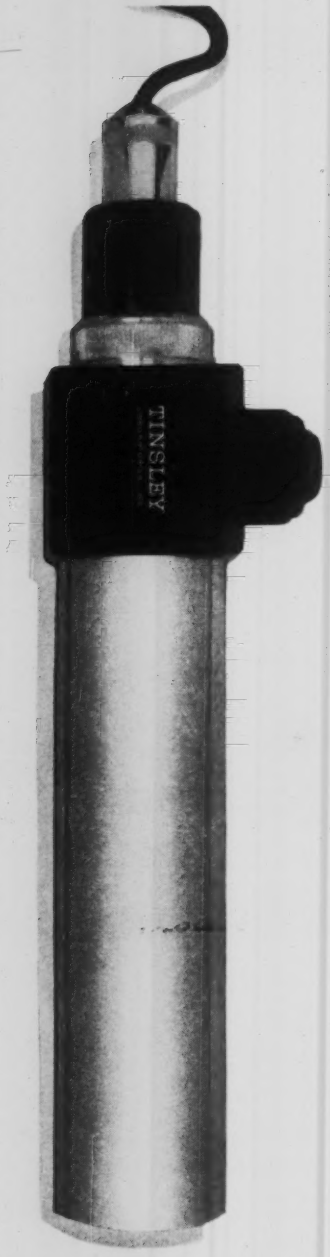
GENERAL ELECTRIC

CIRCLE 229 ON READER-SERVICE CARD

Test Equipment

1960 BUYERS' GUIDE 6

PHYSICAL TESTING, GAGING, AND INSPECTION EQUIPMENT



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Electric Hotpack
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Hallikainen Instrs
Koehler Instr Co
Labline Inc
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National Appliance Co
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AUTO-COLLIMATORS
Alfa-American Corp
Barnes Engineering
Berger & Sons C L
Davidson Optronics
Engis Equipment
Gaertner Scientific
Garlynn Engrg Co
Gordon Enterprises
Opto-Metric Tools
Palos Optical Co
Penn Optical & Instr
Scherr Co George
Tinsley Labs
Unertl Optical Co

BALANCING MACHINES, Dynamic
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Bear Mfg Co
Cosa Corp
Decker Corp
Dynametrics Corp
Electro-Autosizing
Gilmore Industries
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Davenport Mfg
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Hirschmann Co Carl
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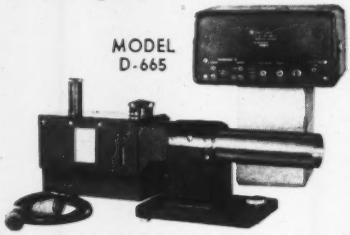

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Pratt & Whitney
Scherr Co George
Scheffield Corp
Slocomb Co J T
Stocker & Yale
Unitron Instrument
Weston Instruments

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Branson Instruments
Daytronic Corp
Decker Corp
Dice Co J W
Dynapar Corp
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Engis Equipment
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Metrol Inc
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Photobell Co
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Dyna-Empire Inc
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Engis Equipment
Exactel Instrument
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Opto-Metric Tools
Pratt & Whitney
Scherr Co George
Sheffield Corp
Size Control Co
Slocomb Co J T
Standard Gage Co
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Engis Equipment
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United Aircraft Prods
U S Gauge Div
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Westronics Inc
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Epic Inc
Gaertner Scientific
Riehle Testing

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Hirschmann Co Carl
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Metrol Inc
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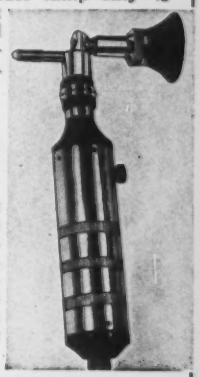

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Cutter is optional

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Bracke-Seib X-Ray
Designers for Industry
GE X-Ray Dept
Nuclear Fix Corp
Picker X-Ray Corp
Weston Instruments

FLAW DETECTORS, Ultrasonic
Arenberg Ultrasonic
Branson Instruments
Circo Ultrasonic
Designers for Industry
Dice Co J W
Magnaflux Corp
Natl Ultrasonic
Photocon Research
Sperry Products Inc
Sunshine Scientific

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Sperry Products Inc

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Associated Testing Labs
Automatic Timing & Contls
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Baldwin-Lima-Hamilton
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Exline Engrg
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Brabender Instr C W
Carlson Co
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Designers for Industry
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Mast Development
Metrol Inc
Newage Industries
Opto-Metric Tools
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Testing Machines Inc
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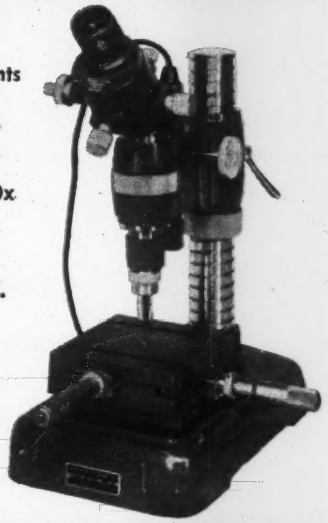

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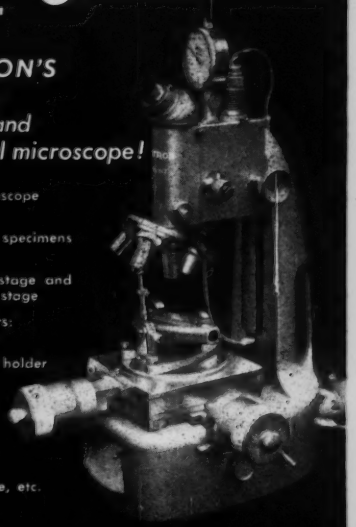

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- Inclinable work and tool holder
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Even the smallest shop can rapidly pay for this versatile instrument in time and materials saved. UNITRON Model TM, with all its features, costs about the same as the lowest priced, simple shop microscope. .....fob Boston only **$1050**

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Epic Inc
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Gordon Enterprises
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Penn Optical & Instr
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Scherr Co George

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Engis Equipment
Gaertner Scientific
Graf-Apsco Co
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Sanders Labs
Scherr Co George
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Unertl Optical Co
Unitron Instrument
Zeiss Inc Carl

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Buhl Optical Co
Coast Instrument
Curtis Labs
Davidson Optronics
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Engis Equipment
Fecker Inc
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Gaertner Scientific
Gurley W & L E
Heitz Inc Karl
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Hirschmann Co Carl
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Burrell Corp
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Sunshine Scientific
Taber Instrument
Torsion Balance Co

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Coleman Instrument Co
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Crosby-Ashton
Dyna Metrics Corp
Gilmore Industries
Karr Co R J
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Bausch & Lomb
Buhl Optical Co
Eastman Kodak
Engis Equipment
Gaertner Scientific
Hirschmann Co Carl
Lafayette Instr
Opto-Metric Tools
Richardson Camera Co
Scherr Co George
Stocker & Yale
Unitron Instrument

PROJECTORS, Micro

American Optical Co
Bausch & Lomb
Buhl Optical Co
Engis Equipment
Graf-Apsco Co
Hirschmann Co Carl
Mast Development
Opto-Metric Tools
Scherr Co George
Stocker & Yale

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Radiation Electronics
Scott Testers Inc
Shore Instrument
Testing Machines Inc
United Electric Controls

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Sheffield Corp
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Weston Instruments

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Epic Inc
Gaertner Scientific
Gordon Enterprises
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Carlson Co
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Hirschmann Co Carl
Hunter Spring Co
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Riehle Testing
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Gurley W & L E
Pratt & Whitney
Renick Co L C
Scherr Co George
Sheffield Corp
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STANDARDS, Surface Roughness and/or Finish

Consol Electrodynamics
Engis Equipment
Sunshine Scientific
Surface Checking Gage

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Strain Gage Instrumentation

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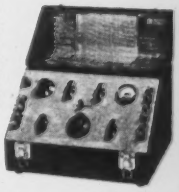
Very convenient general purpose box. Static readings on meter. Dynamic readings on dc 'scope. Transistor dc amplifier with excellent low noise and drift. **Bulletin #6.**

BA-12 Bridge Amplifier



Accurate monitoring of fatigue tests. "Dynamic Null Balance" gives accuracy within 1% on steady dynamic signals. Used with any cathode-ray oscilloscope. **Bulletin #5.**

B-1 Bridge

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BSG-6 Switch and Balance, Bulletin #14.

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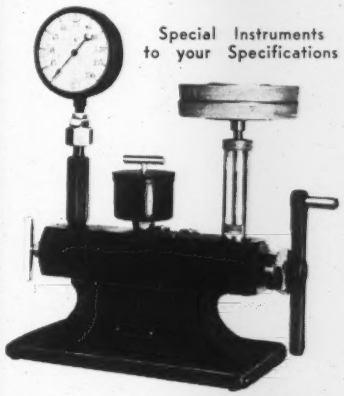

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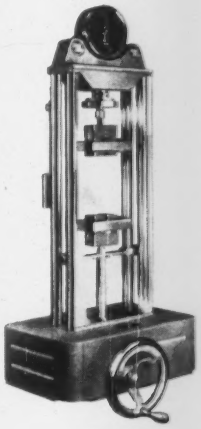

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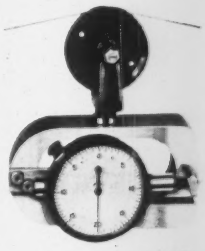

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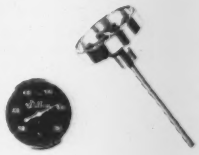

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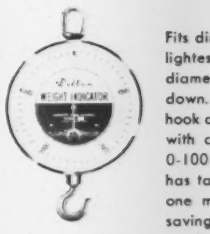

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7 General Instrumentation

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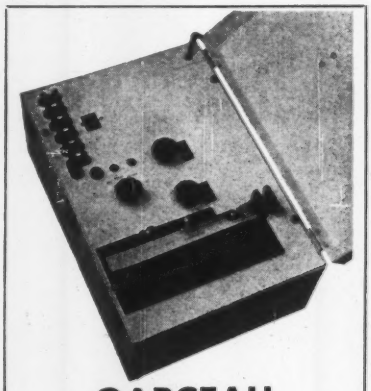

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6	7/8	3/8	45
10	1	7/16	45
12	1 1/4	7/16	45
14	1 7/16	33/64	20
16	1 3/4	5/8	10
18	2	11/16	10
20	2 1/4	11/16	10
24	2 3/4	11/16	10

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Since 1850
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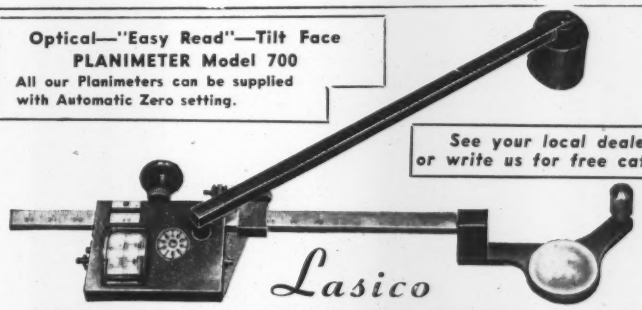
Optical—"Easy Read"—Tilt Face PLANIMETER Model 700
All our Planimeters can be supplied with Automatic Zero setting.

See your local dealer or write us for free catalog



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2451 Riverside Drive Los Angeles 39, Calif.
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Also repair service on all makes.

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Dekoron® Products Division
SAMUEL MOORE & CO. • MANTUA, OHIO

Telephone Crestwood 4-2276

DEKORON MULTICOUPLE EXTENSION WIRE

Dekoron multiple pair harness of thermocouple extension wire is available in three constructions, each in either Iron-Constantan or Chrome-Alumel. Each is guaranteed to meet or exceed ISA specs for standard grade extension wire.

DEKORON ARMORED INSTRUMENT HARNESS

Four different tubing materials combined with four distinct types of armoring give 16 different types of Dekoron Armored Instrument Harness. Special Moore-Loc (modified square lock) galvanized steel armor has almost twice the pull-apart resistance of ordinary armor. Also has cord packing for extra resistance to moisture and fume penetration.

CONDENSED SPECIFICATIONS

COPPER TUBING

To ASTM B68 Type DHP specifications and pressure tested to ASTM B75 specifications.

¼ OD x .030″ in 50, 100, 500 and 1000′ lengths
⅜ OD x .032″ in 50, 100 and 500′ lengths
½ OD x .035″ in 50 and 100′ lengths

ALUMINUM TUBING

Drawn, seamless, annealed 5050-0 Utilitube. Sizes and lengths:

¼ OD x .032″ in 50, 100 and 500′ lengths
⅜ OD x .035″ in 50, 100 and 500′ lengths

POLYETHYLENE TUBING

High molecular weight, virgin polyethylene. Sizes and lengths:

¼ OD x .040″ in continuous lengths in increments of 100′ to 1000′
⅜ OD x .062″ in continuous lengths in increments of 100′ to 1000′
½ OD x .062″ in continuous lengths in increments of 100′ to 500′

PLASTIC SPECIFICATIONS

Polyethylene

Used as the sheath on single-line tubing, Metl-Cor and for black "P" Tubing, this polyethylene meets following specifications: ASA, REA, IPCEA requirements on weather resistance, chemical resistance, heat stability, and surpasses requirements under ASTM 1248-52T. Polyethylene, other than black, contains no ultraviolet inhibitor and should not be used outdoors. Black polyethylene is unaffected by ozone. This polyethylene remains flexible below —100°F.

Polyvinyl Chloride

Used as the sheath on Poly-Cor, "M" Ribbon, "P" Ribbon and single-line tubing, this polyvinyl chloride meets UL, ASTM, IPCEA, AN-C-168, AN-J-C-48A, J-C-129, and MIL-C-915 specifications.

Factory stocks of products described in this bulletin are made of materials that comply with specifications outlined above. Other materials and sizes, tube combinations, etc., are available on special order. Manufacturer reserves right to alter specifications without notice and incurring liability for products already shipped.

ACCESSORIES

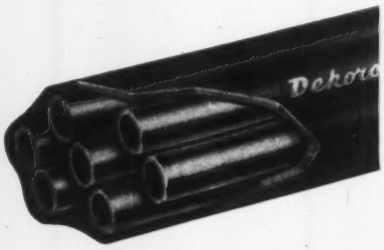
To facilitate installation of Dekoron products, we supply a line of tubing accessories which includes the following: junction and union boxes, E-Z fittings for plastic tubing, "P" Tubing clips, reel stands, harness straighteners, corner troughs and other aids for cutting installation costs.

INSTALLATION DATA

Complete data regarding bending radii, centers of support, hangers and clamp sizes and types, and various proven methods of installation are available on request.

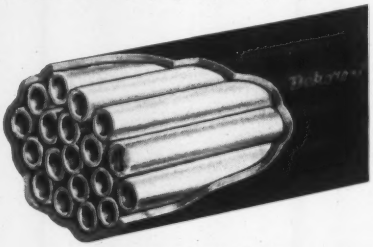
RESEARCH AND DEVELOPMENT SERVICE

Our Research and Development Department is constantly striving to design and develop new and improved products to enable instrument users to cut installed costs to the minimum and to achieve longer service-free life. The facilities of this department are available to you now to develop products and techniques to meet your specific requirements. Since our development program is continuous, we may already have solved your problem. Always check with the Dekoron Products Division first for the answers to your instrument tubing needs.



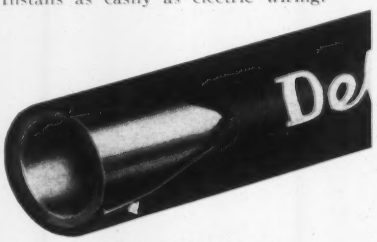
DEKORON METL-COR

Instrument line harness with tube combinations of 2 to 37 individual copper or aluminum tubes covered with chemically resistant sheath of polyethylene plastic.



DEKORON POLY-COR

Bundle of from 2 to 37 individual polyethylene tubes covered with vinyl plastic. Installs as easily as electric wiring.



DEKORON TUBING

The original plastic-coated metal instrument tubing. Available with copper, aluminum or steel core tube. Resists chemical attack, outlasts expensive alloy tubing.

DEKORON "P" TUBING

Highest quality single-line polyethylene instrument tubing. Easy to install; requires no special tools.

Dekoron is more than a name for chemically resistant instrument tubing. The Dekoron trademark now identifies a complete line of tubing products—instrument line harness, tubing, fittings, and accessories for tubing up a pneumatic system. Dekoron products cost less to buy . . . less to install . . . last longer. *So tube up with Dekoron products and watch your costs come tumbling down.*

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Milton S. Frank Co.
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Phone: YUkon 2-5405

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Phone: GLendale 5-4766

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Phone: REdwood 6-0749

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Phone: LExington 9-5558

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5-5143

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Portland 22, Ore.
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Robert Klein
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Houston 25, Texas
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WAlnut 1-1618

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Phone: PRo-pect 2-7274

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Phone: ADams 2-1460
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Montreal: VIctor 2-3015

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Components

1960 BUYERS' GUIDE

8

ELECTRICAL, ELECTRONIC, MECHANICAL, ELECTROMECHANICAL AND OPTICAL COMPONENTS

CRESCENT ARMORED MULTITUBE

—an armored group of 2 to 37 long length tubes of the user's choice, SPIRALLY CABLED together to permit maximum bending without distortion of the tubes. Mechanical and corrosion protection is accomplished by a flexible, interlocked, metallic armor or corrosion-resistant polyvinyl chloride sheath, or combination of both. There is a type of MULTITUBE to meet your requirements and give you the best protected instrument and control tubing installation at the lowest installed cost. We are able to provide your type promptly from large factory stocks of tubing.

TYPE CA
(General Purpose)

employs SPIRALLY CABLED copper tubes covered with a vinyl insulating tape and flexible, interlocked, galvanized steel armor.

TYPE CAT

has a vinyl insulating tape over the SPIRALLY CABLED copper tubes with a flexible, interlocked, galvanized steel armor and polyvinyl chloride (PVC) thermoplastic sheath. This construction provides mechanical and corrosion protection for the tubing as well as corrosion protection for the armor. For outdoor, wet and corrosive locations.

TYPE CTA

consists of SPIRALLY CABLED copper tubes with a polyvinyl chloride (PVC) thermoplastic sheath and flexible, interlocked, galvanized steel armor. The sheath protects the tubing against corrosion and the armor protects both tubing and sheath from mechanical injury. Recommended for general outdoor use and when a high degree of mechanical protection is desired for exposed locations or during installation such as direct burial in concrete or blacktop and pulling into conduit.

TYPE CTAT

provides maximum mechanical and corrosion protection. It has a polyvinyl chloride (PVC) thermoplastic sheath over the SPIRALLY CABLED copper tubes, with a flexible, interlocked, galvanized steel armor and polyvinyl chloride (PVC) thermoplastic sheath overall. For particularly corrosive locations as in refineries and petrochemical plants.

TYPE CT

The SPIRALLY CABLED copper tubes are protected by a polyvinyl chloride (PVC) thermoplastic sheath that is tough, resistant to water, acids, alkalies, oils and most chemicals and will not support combustion. Recommended for use in damp or corrosive locations, in troughs or attached to sheltered building surfaces where it will not be subjected to mechanical injury.

CRESCENT PLASTIC COATED SINGLE TUBE

For the individual connecting lines in a corrosion-protected system use CRESCENT PLASTIC COATED SINGLE TUBE. Copper or Aluminum tubing is protected from corrosion with the same tough, flame-retarding polyvinyl chloride (PVC) thermoplastic sheath as used on MULTITUBE.

CRESCENT POLYETHYLENE MULTITUBE

consists of 2 to 37 precision Polyethylene tubes *spirally cabled* together for greatest flexibility. The tubing assembly is protected against mechanical injury by an interlocked, galvanized steel armor, Polyvinyl Chloride sheath, or other sheaths, as below.

STANDARD TYPES

TYPE PA

TYPE PA—Interlocked metallic armor provides complete mechanical protection.

TYPE PAT

TYPE PAT—Polyvinyl chloride sheath over the armor adds corrosion protection for the armor. Can be buried in the earth.

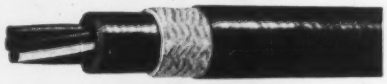
TYPE PT

TYPE PT—PVC sheath gives limited mechanical protection. For use in troughs, trays or conduit.

SPECIAL SERVICE TYPES

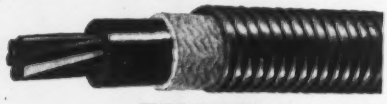
TYPE XPT-U

TYPE XPT-U—Extra heavy PVC sheath over high modulus TYPE XP tubing permits direct burial, or use above ground where subject to moderate abuse.



TYPE XPT-F

TYPE XPT-F—Same as XPT-U with heavy asbestos braid and outer PVC sheath. Provides time delay in event of flash fire.



TYPE XPT-FA

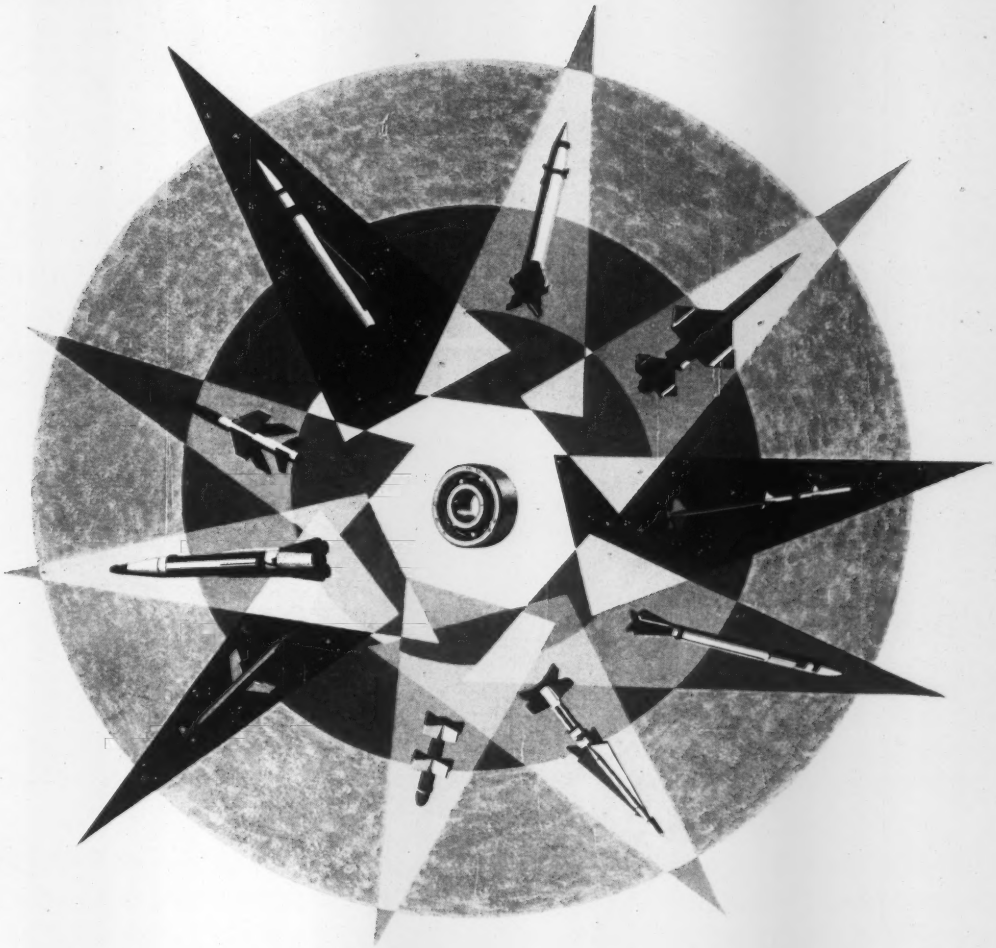
TYPE XPT-FA—Same as XPT-U with heavy asbestos braid and interlocked metallic armor. Provides complete mechanical protection, as well as time delay in event of flash fire.

WRITE FOR BULLETIN NO. 458-J

CRESCENT INSULATED WIRE & CABLE CO. INC.

TRENTON, NEW JERSEY

CIRCLE 251 ON READER-SERVICE CARD



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TITAN
HAWK
ATLAS
NIKE B
BOMARC
NIKE ZEUS
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SPARROW II
SPARROW III
NIKE HERCULES
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PRODUCERS OF RECORDING CHARTS

HAVE INTEGRATED THEIR

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Here are charts that you can rely on! You can count on precision, developed during 50 years of specialization in chart printing by Staebler & Baker Inc. and Technical Charts Inc. You can count on service, developed during the 20 years Technical Sales Corporation has been their exclusive distributor. Two and a half years ago the three companies combined with two others to form *Graphic Controls Corporation*. Today this integration is complete, bringing a new approach to your recording chart needs.

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CIRCLE 254 →

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BORG

RELAX, FRIEND!

Don't go shootin' up the place just 'cause you went for those cheap component "buys" in your last program. Next time get yourself some reliable Borg components, install 'em and relax! Ok? Ok!

- POTENTIOMETERS
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- MULTI-TURN COUNTING DIALS
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- FREQUENCY STANDARDS

BORG EQUIPMENT DIVISION
AMPHENOL-BORG ELECTRONICS CORPORATION
JANESVILLE, WISCONSIN

900 Series Micropots
Single, three and ten turn models. Independent, zero based or absolute reference linearity. Resistances to 300,000 ohms. Tested to 350° F.

205 Series Micropots
Ten turns. Independent or zero based linearity 0.1% to 0.05%. Resistance 25 to 100,000 ohms.

1100 Series Micropots
Ten turns. Independent linearity 0.5% to 0.1%. Resistance 25 to 100,000 ohms.

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990 and 991 Series Trimming Micropots. Wirewound and carbon element. Size 1¼" x 5/16" x 17/64". Resistance 10 ohms to 1 megohm — others on special order. Adjustment of complete range: wirewound — 40 turns; carbon element — 25 turns. Printed circuit, soldered lug, insulated wire lead terminals.

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Turn-counting dials. In-line digital presentation for fastest perception. Three-digit, ten-turn, four-digit hundred-turn and five-digit thousand-turn models. Also available — concentric scale models.

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A new concept in dial appearance to further stylize panel designs. Retain superior mechanical features of Borg Concentric Scale Microdials.

Borg Fractional H.P. Motors
Synchronous or induction. Gear-trains. Two and four pole models. Ball-bearing type. Totally enclosed housings.

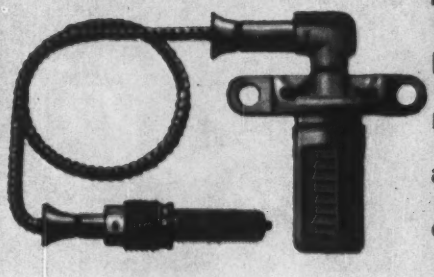
for your copy of Catalog BED-A90

CIRCLE 255 ON READER-SERVICE CARD

CIRCLE 256 →

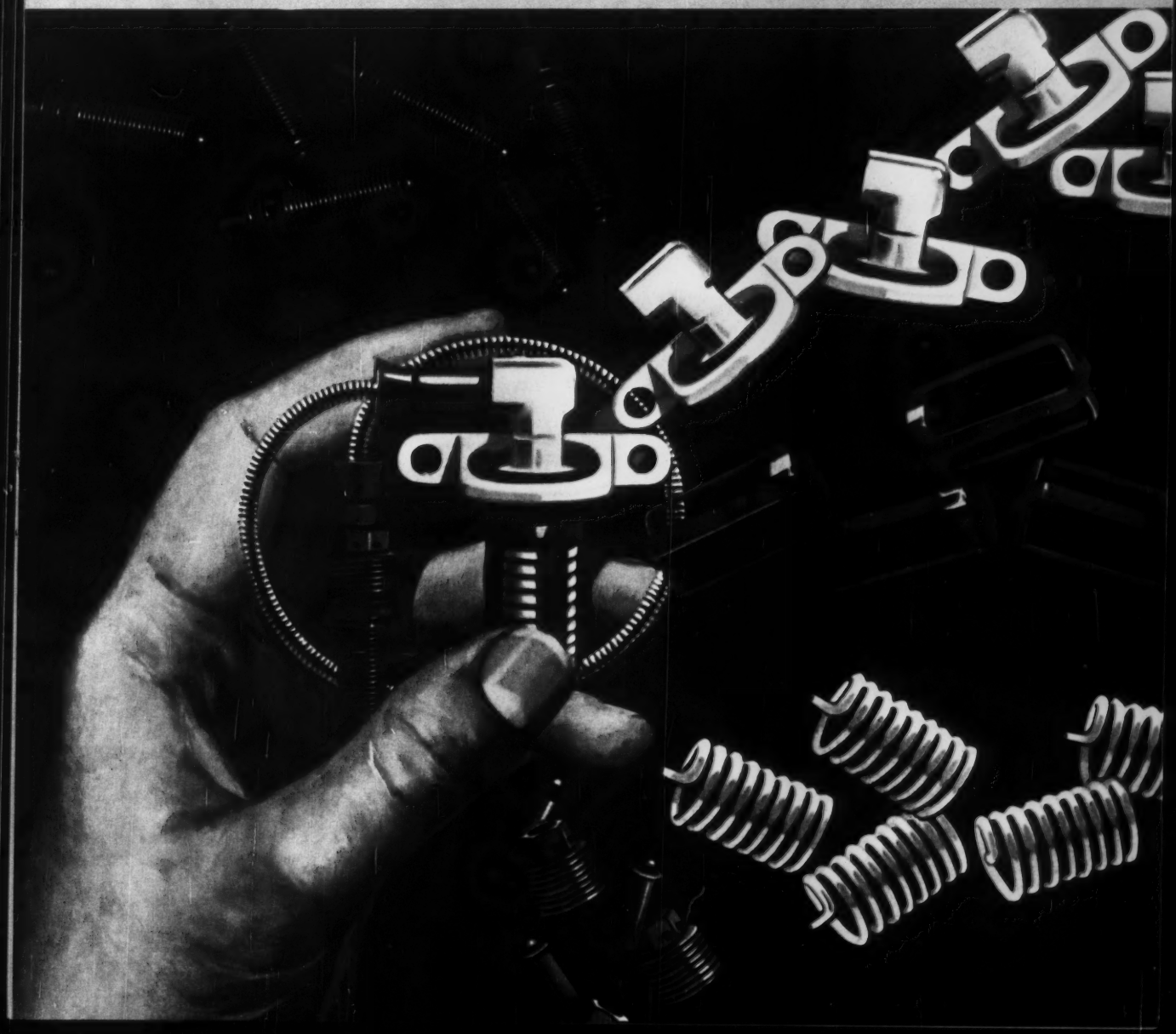
Robertshaw sets the pace with

PACKAGED BELLOWS

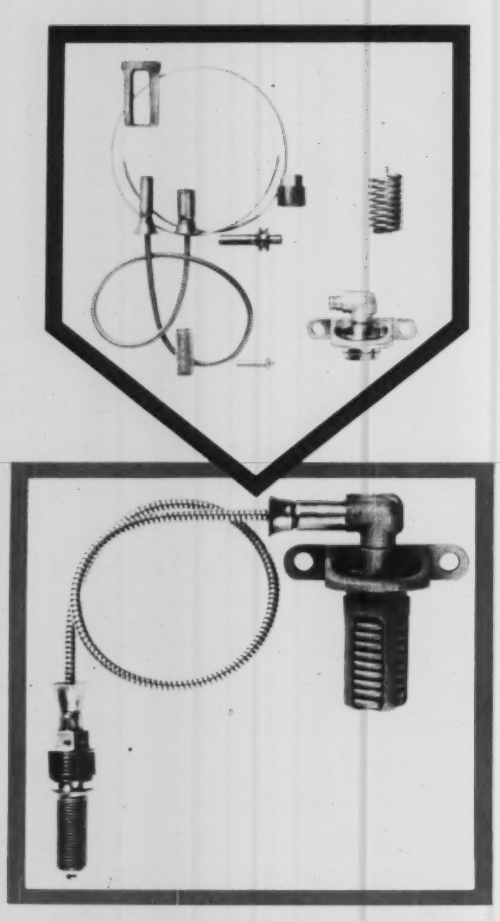


Don't lose orders...this single-source, cost-saving method can give you price and performance advantages your competitors can't match in equipment involving metallic bellows assemblies!

over



Robertshaw sets the pace with



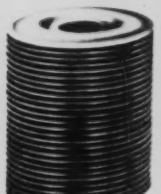
PACKAGED BELLOWS

...from one source at one low cost!

In one custom-engineered, pre-assembled "package", you can now obtain hydraulically formed or welded metallic bellows and all assembly components from Robertshaw . . . at a definite saving. Packaged Bellows are designed, produced, assembled and tested right in our modern plant, and delivered to you ready for installation. You save on handling, assembling, inspections, testing and paper work.

No other bellows supplier can offer you such a wide range of bellows metals and alloys . . . including titanium, zirconium, Hastelloys, Inconel-X, Monels, stainless steels and all the standard bellows metals. Bellows sizes are available from miniature ¼" O.D. up. If your applications require it, Robertshaw can supply Packaged Bellows for operation in the range of 1000°F plus and above 3000 psia pressure. Proper selection of metals, plus precision manufacturing, can also give you the resistance to corrosion and vibration that your tough applications demand.

Write for Bellows Bulletin 10 giving typical application data!

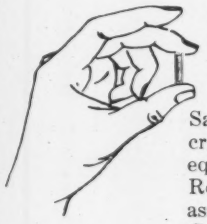


New Robertshaw

FORMWELD BELLOWS

for premium performance!

Welded of any suitable weldable material, including many of the newer metals and alloys, to give you much greater adaptability to extreme environmental and service conditions. Closer control of bellows tolerances than ever before possible now assures greatly improved accuracy, predictable performance and longer life. Write for Bulletin 70!

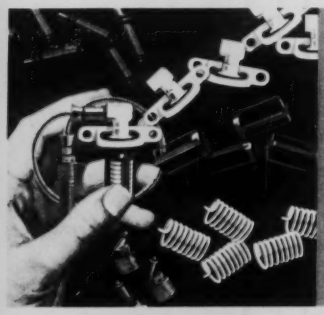


Robertshaw

Miniaturized

BELLOWS

Save vital space and weight in aircraft, instrumentation and other equipment with hydraulically formed Robertshaw seamless metallic bellows as small as ¼" O.D. and 5/16" O.D. Custom-engineered in many metals to give you the exact characteristics you need. Write for Bulletin 10!



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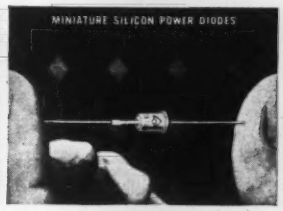
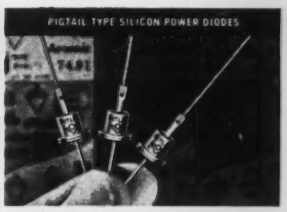
For all DC needs from microwatts to megawatts!

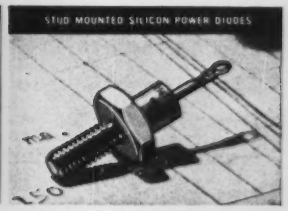
Ratings: 20 to 160 volts • 100μa to 11 ma.
Ideal components for bias supplies, sensitive relays, computers etc. High resistance, (10 megohms and higher at -10 volts). Excellent linear forward characteristics. Extremely small, low in cost. Encapsulated to resist adverse environmental extremes. Specify **Bulletin SD-18.**



Ratings: 100 to 600 PIV, Up to 500 ma.
Specifically designed for missile and airborne equipment applications where miniaturization and reliability are prime factors. Hermetically sealed, all-welded, pigtail lead construction. Manufactured to meet the most rigid military requirements. Request **Bulletin SR-303**

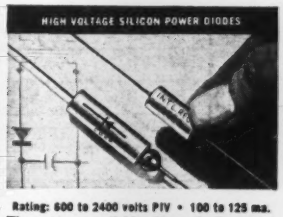


Ratings: 50 to 600 volts PIV • 250 to 750 ma.
An extensive line of silicon power diodes for military and industrial applications featuring all-welded, hermetically sealed construction. All designed and manufactured to meet the most rigid military requirements. For information on types for your application **Contact Factory**

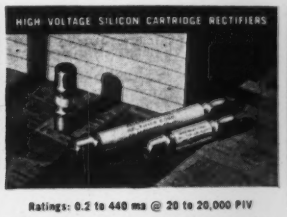


Ratings: 50 to 600 volts PIV • 400 ma. to 1 amp.
Industrial and military types including the 1N253, 1N254 and 1N255. Stud mounted, hermetically sealed, all-welded construction. Operating temperature range: -55°C to +150°C. Designed and manufactured to meet most rigid military specifications. **Bulletin SR-133C**

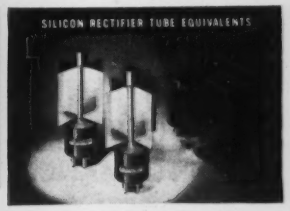
Ratings: From 100 ma. to 50 Amps.
Low forward voltage drop and low leakage characteristics make this series ideal for a wide variety of power applications. For details request **Bulletin C-349,** (26 volt cells); **Bulletin SR-160,** (45 to 52 volts per cell) and **Bulletin SR-152,** on high current density cells.



Rating: 600 to 2400 volts PIV • 100 to 125 ma.
Three types available. Hermetically sealed, pigtail construction. Style J rated at 600 to 1000 volts PIV at 125 ma. **Bulletin SR-138E** Styles K and L with PIV ratings from 600 to 2400 volts at 100 ma. dc output current are described in technical detail—**Bulletin SR-157.**



Ratings: 0.2 to 440 ma @ 20 to 20,000 PIV
Designed for miniaturized equipment where optimum reliability is a prime factor. Silicon cartridges – hermetically sealed in metallized ceramic housing. **Bulletin SR-225.** Selenium cartridges – available in phenolic and hermetically sealed types. **Bulletin N251.**



Ratings: 85 to 600 ma • 1500 to 6000 PIV.
Highly reliable series of tube replacement rectifiers rated from 1500 to 6400 PIV, 85 to 600 ma (including the ST-7 replacement for the 866 Tube) offer the superior characteristics of silicon on a wide range of high voltage applications.
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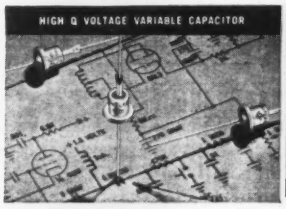

Ratings: Q of 1000, 200 PIV DC
Semicap's small size, light weight, high reliability and low power requirements make it ideal for automatic frequency control, frequency modulation oscillators and filter networks. All-welded hermetically sealed, shock-proof housing. Request **Bulletin SR-205.**

Ratings: From 600 milliwatts to 10 watts
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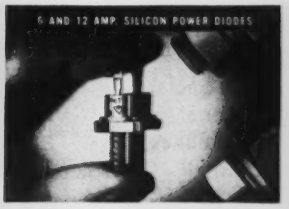

Ratings: 6 and 12 Amps • 50 to 500 PIV.
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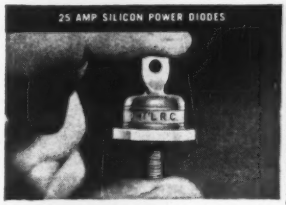

Rating: 50 to 500 volts PIV • 25 to 45 Amps.
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Voltage Regulation: ±0.01%
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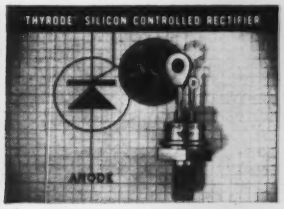

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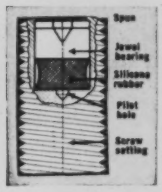

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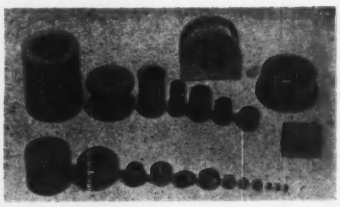

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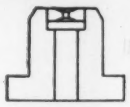

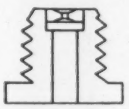

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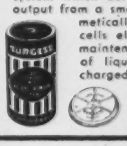

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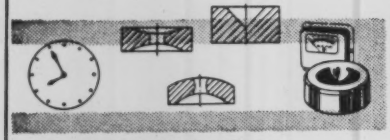

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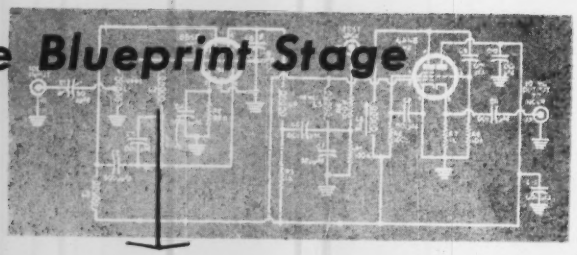

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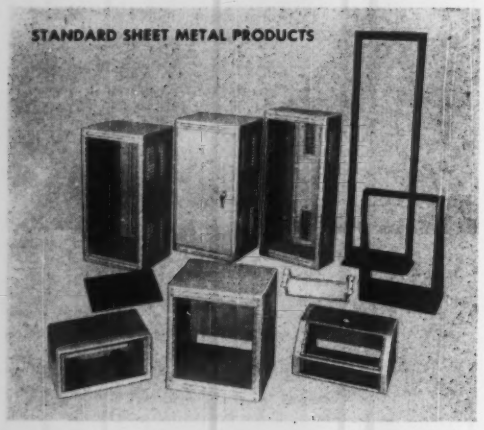

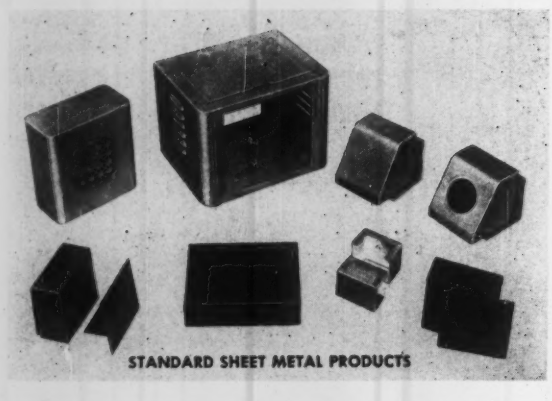

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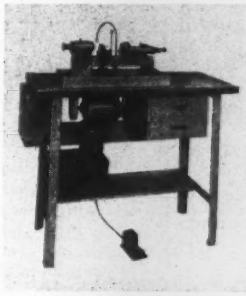

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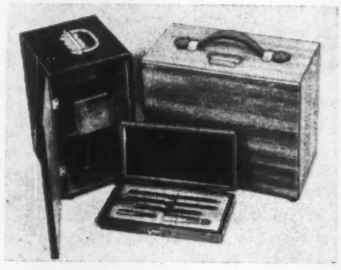

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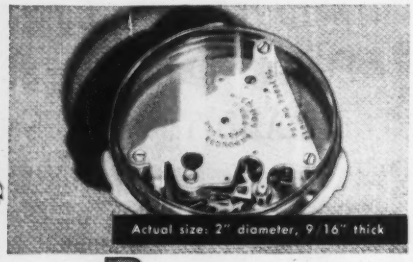

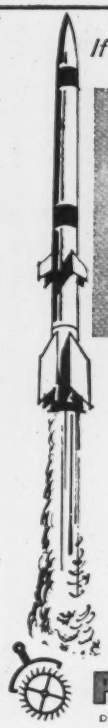

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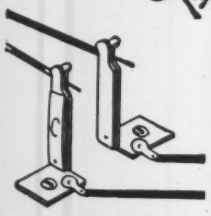

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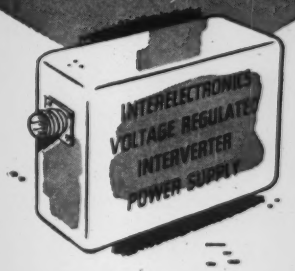

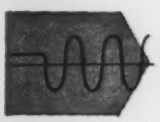

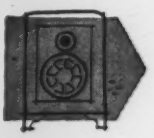

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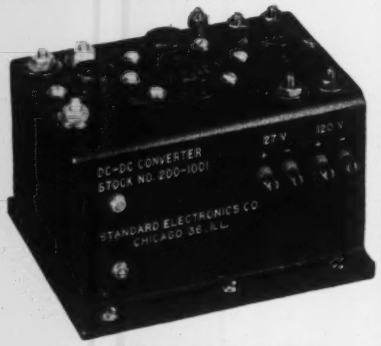

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Potassium Chloride
Potassium Fluoride
Potassium Iodide
Potassium Iodide (Thallium Activated)
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Rubidium Chloride
Rubidium Iodide
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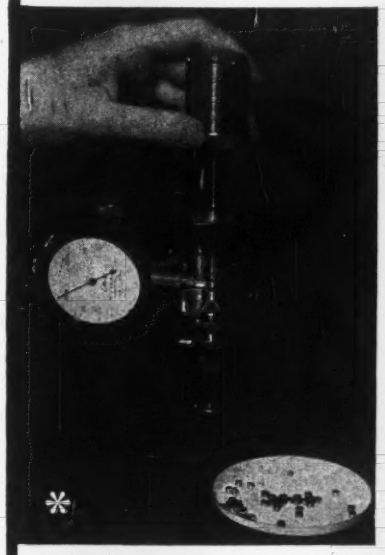

Bird can supply you with sapphire and borrosilicate glass precision jewel bearings in a wide range of standard types, sizes, and complete assemblies — or, custom-built to your specifications. Special mounting techniques provide exact tolerance jewel assemblies, mounted or set in bushings or screws, ready for assembling into your product without further inspection. Jewels mounted with resilient silicone rubber or spring cushions provide additional protection to shock and vibration.

Because of the exact tolerances, maintained through the most rigid quality-control methods, Bird jewels are used by the foremost manufacturers of electrical, aircraft, and timing instruments — and recorders.

Typical products include:

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**Illustrated — Concentricity check of mounted ring jewels — one of the inspection processes in Bird's quality control program.*

Our engineering staff is at your service for all small bearing problems. A request on your letterhead for Bulletin 100-6 will receive our prompt attention.

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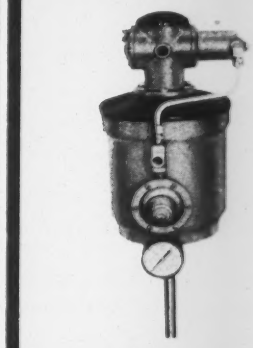

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Conoflow Series 50 Cylinder Conomotor Actuator affords automatic throttling control for many types of process regulating equipment previously limited to hand control. The Cylinder Conomotor is a powerful pneumatic servomechanism capable of following the exact signal outputs of modern electronic and pneumatic instruments.

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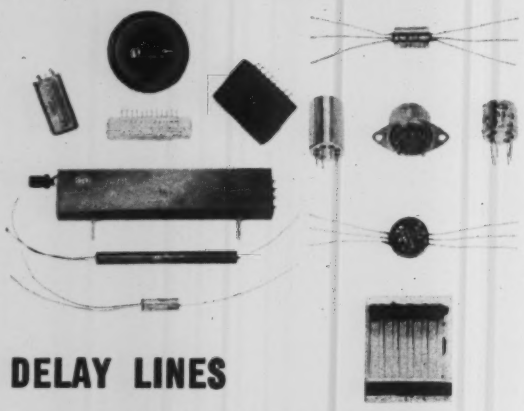

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Accurate and completely reliable, the Hagan Power Positioner has plenty of power for the exact positioning of dampers, valves and other mechanisms.

Movement of piston is normally linear with signal pressure, but any desired relationship may be obtained by shaping the cam of the integral feedback mechanism. The Hagan Power Positioner is air operated, and uses full 80-120 psig power air.

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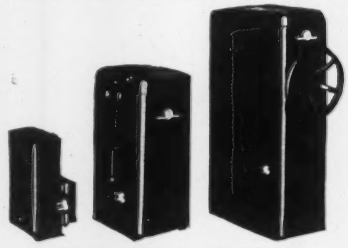

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CONTROL DRIVES

• These air-operated power units provide precise positioning of regulating devices such as dampers, butterfly valves, hydraulic couplings and feeders in accordance with a pneumatic control signal.

Improves flow characteristics through simple adjustment of positioning relay incorporated in the drives.

Easy installation and choice of location made possible by angular rotation of power take-off plus full assortment of standardized connecting linkage.

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AC44P	75	75°
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AC816P	1500	90°
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AC1030P	1600	30 in.
AC1260P	2500	60 in.

Request Product Specification P81-1 for Control Drives and Product Specification P81-5 for control linkage.

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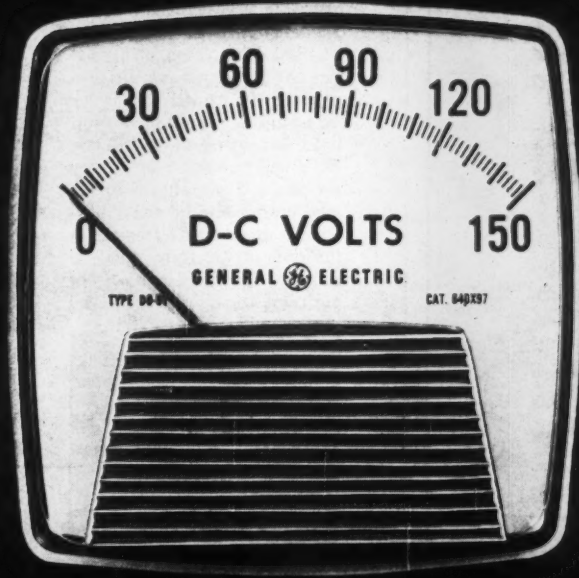


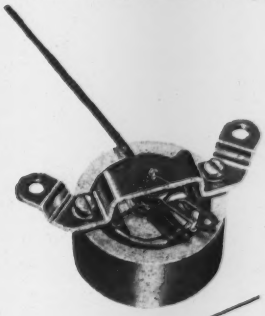
3½-inch size

General Electric small panel meters

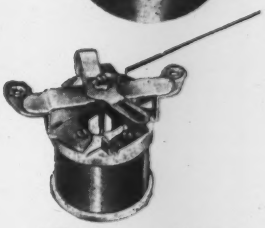
BIG LOOK styling of General Electric's new small panel meters adds *functional beauty* to your products and equipment. Distinctive design creates the illusion of bigness, yet these new meters fit into the same panel space as old style meters. You get big border-to-border scale . . . *modern, clean-line design* . . . *your choice of seven attractive colors* . . . and widest selection of scales.

Up to 28% longer scales allow accurate readings. Tough neoprene gaskets provide *complete protection* of internal parts and movements from dirt, dust or water. Best of all, General Electric BIG LOOK meters are *competitively priced*. And you can plan on *fast delivery*, too, from a national network of authorized stocking distributors and G-E Apparatus Sales Offices.

Let G.E.'s BIG LOOK in panel meters help you improve the appearance and reliability of your equipment at low cost. Get the full story. Just contact your G-E Apparatus Sales Engineer, or write for bulletin GEA-6678, Sect. 593–303, General Electric Co., Schenectady, N. Y.



SELF-SHIELDED CORE-MAGNET, used in d-c milliammeters below 5 MA and all microammeters, permits mounting of meters on magnetic or non-magnetic panels without special calibration.



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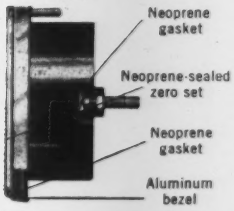

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for the 310 to 389 mμ Ultraviolet Spectral Region.

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Made in West Germany

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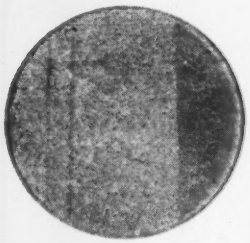

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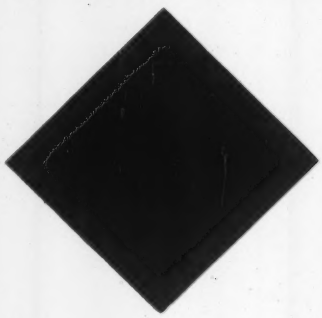

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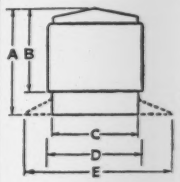
AVAILABLE MODELS for 1/4" shafts

Description	50 Series	70 Series		90 Series		125 Series		175 Series		225 Series	
Style	Cat. No.	Cat. No.	Std. Pkg.	Cat. No.	Std. Pkg.	Cat. No.	Std. Pkg.	Cat. No.	Std. Pkg.	Cat. No.	Std. Pkg.
Round	50-1-1	70-1-2	12	90-1-2	12	125-1-2	6	175-1-2	6	225-1-2	4
Skirted Round	50-2-1	70-2-2	12	90-2-2	12	125-2-2	6	175-2-2	6	225-2-2	4
Dial Skirted Round	50-3-1	70-3-2	12	90-3-2	6	125-3-2	6	175-3-2	2	225-3-2	2
Pointer	50-4-1	70-4-2	12	90-4-2	12	—	—	—	—	—	—
Skirted Pointer	50-5-1	70-5-2	12	90-5-2	12	—	—	—	—	—	—
Crank	—	—	—	—	—	125-6-2	3	175-6-2	2	225-6-2	2

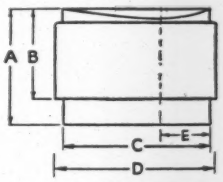
Cat. Nos. above for mirror finish. For matte finish, add "G" to end of number.
*Bar Knob—Cat. No. 1154-G1 (mirror), 1154-G2 (matte)
50 series available 1/8" shaft only

ROUND & DIAL



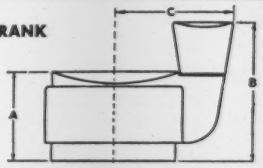
Series	A	B	C	D	E
70	.80	.62	.65	.72	1.14
90	1.03	.80	.83	.93	1.51
125	.87	.70	1.16	1.27	1.82
175	1.09	.85	1.67	1.77	2.45
225	1.11	.89	2.16	2.27	3.01

POINTER



Series	A	B	C	D	E
70	.80	.62	.94	1.06	.32
90	1.03	.80	1.23	1.38	.42

CRANK



Series	A	B	C
125	.87	1.38	1.09
175	1.09	1.77	1.50
225	1.11	1.80	1.75

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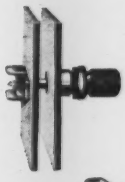
Shaft Lock

For use with screwdriver-adjusted controls • Constant friction drag prevents accidental rotation • Provides seal against dirt and moisture • Replaces standard mounting hardware



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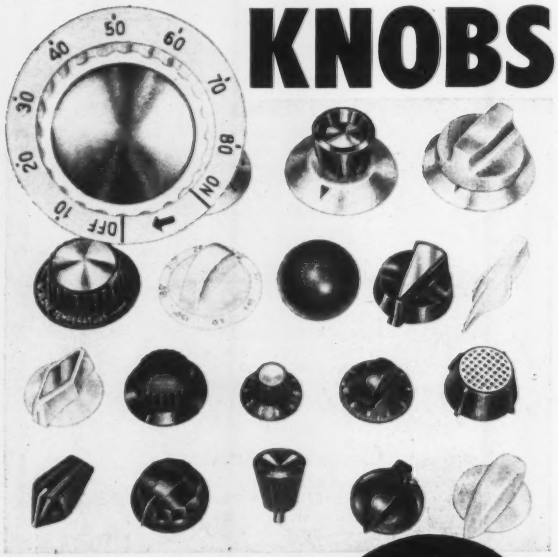

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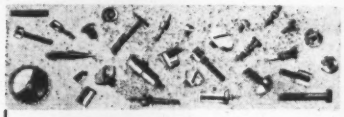

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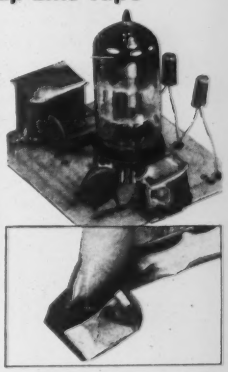

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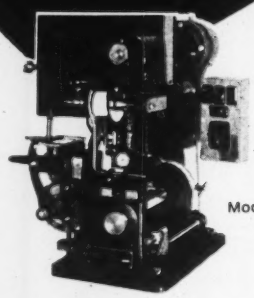

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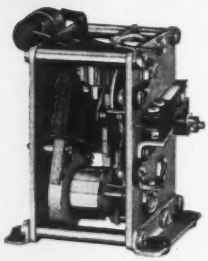

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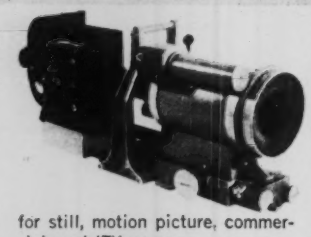

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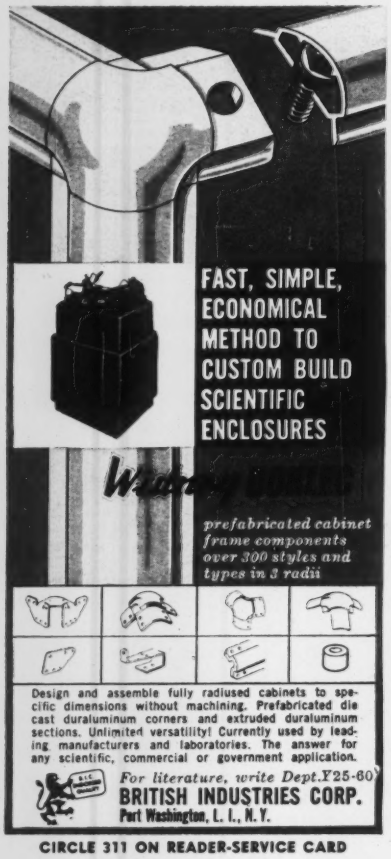
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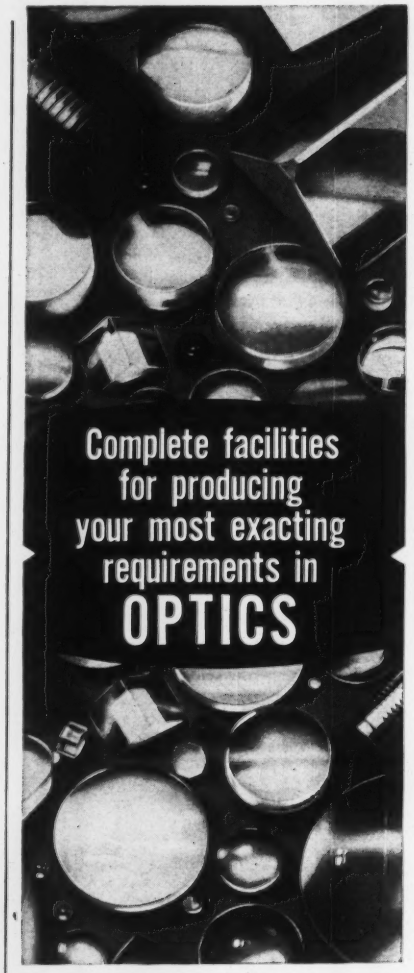

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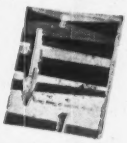

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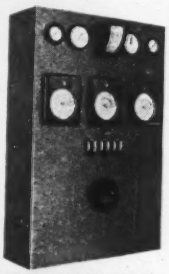

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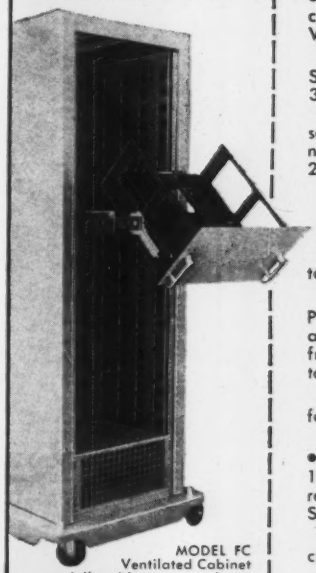

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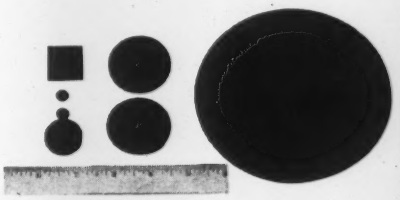

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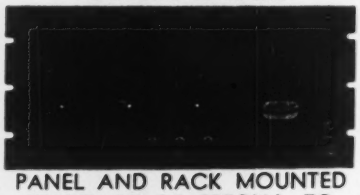

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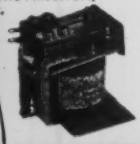

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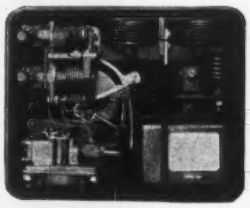

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Allis-Chalmers
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Automatic Switch Co
Automation Controls Corp
B/W Controllers
Brach Mfg Corp
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Allied Control Co
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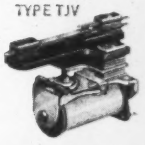
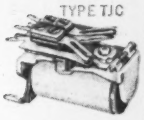
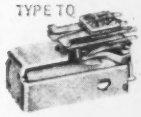
Automatic Timing & Contls
Automation Controls Corp
Brach Mfg Corp
Clare & Co C P







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COMAR

Avoid excessive relay costs... reduce needless relay space requirements... simplify installation and get better performance with relays by Comar, custom-made to your specifications. All types are available with any combination of switches, contact materials, coils, leads and mountings required. Write for complete information today.

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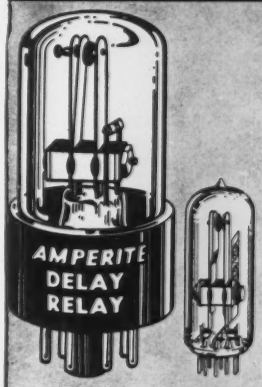
RELAYS • SOLENOIDS • COILS • SWITCHES • HERMETIC SEALING

CIRCLE 321 ON READER-SERVICE CARD

AMPERITE

THERMOSTATIC
DELAY RELAYS



2 to 180 Seconds

Actuated by a heater, they operate on A.C., D.C., or Pulsating Current.

Hermetically sealed. Not affected by altitude, moisture, or climate changes.

SPST only—normally open or closed.

Compensated for ambient temperature changes from —55° to +70° C. Heaters consume approximately 2 W. and may be operated continuously. The units are **rugged, explosion-proof, long-lived, and—inexpensive!**

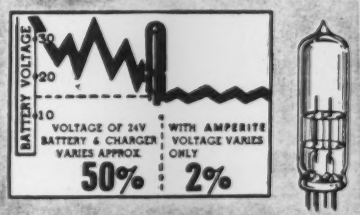
TYPES: Standard Radio Octal, and 9-Pin Miniature . . **List Price, $4.00.**
Standard Delays

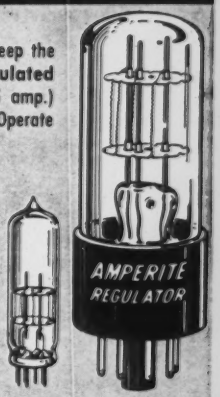
Also — **Amperite Differential Relays:** Used for automatic overload, under-voltage or under-current protection.

PROBLEM? Send for Bulletin No. TR-81

AMPERITE
BALLAST REGULATORS

Amperite Regulators are designed to keep the current in a circuit **automatically regulated** at a definite value (for example, 0.5 amp.) . . . For currents of 60 ma. to 5 amps. Operate on A.C. D.C., or Pulsating Current.





Hermetically sealed, they are not affected by changes in altitude, ambient temperature (—55° to +90° C.), or humidity . . . Rugged, light, compact, most inexpensive . . . . . **List Price, $3.00.**

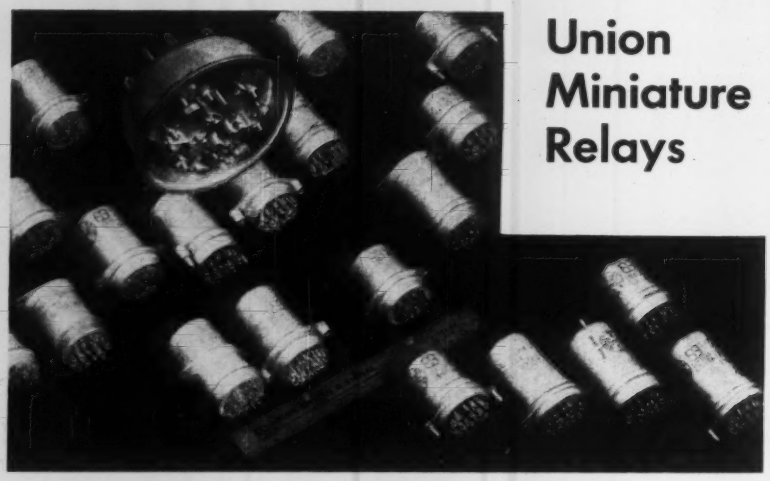
Write for 4-page Technical Bulletin No. AB-51

AMPERITE

561 Broadway, New York 12, N. Y. . . . CAnal 6-1446
In Canada: Atlas Radio Corp., Ltd., 50 Wingold Ave., Toronto 10

CIRCLE 322 ON READER-SERVICE CARD

Tops in reliability!



Union Miniature Relays

Used in seven successful missiles. Union Miniature Relays originally were developed for air-borne and guided missile electronic equipment; they meet or exceed the requirements of MIL-R-25018, MIL-R-6106C, and MIL-R-5757C. They are now being utilized in the following missiles: The Matador, Thor, Talos, Vanguard, Atlas, Titan, and the Jupiter C.

The excellent reliability and small size of the Union Miniature Relays have led to their use in traffic control systems, computers, resistance welders, and other equipment.

OUTSTANDING FEATURES

HI-LO CONTACTS—Permit high and low load handling in same relay. Dry-circuit contacts available for extremely low-level loads.

COIL RESISTANCE—In standard case, from 0.9 to 8750 ohms; in long case, from 1.6 to 13,000 ohms.

TEMPERATURE RATING—Class A −55 to +85°C; Class B −65 to +125°C.

AC OR DC—Nominal operating voltages from 1.5 to 160 volts, DC; 115 volts, 60 to 400 cps, AC. Built-in rectifiers in AC relays.

TYPES AND MOUNTINGS—6PDT or 4PDT; plug-in or solder-lug connections. All usual mountings.

SPECIALS—Slow-acting relays if you need a differential between operating time of various relays. Plate-circuit relays—operate on less than 8 milliamperes; double-coil relays—either coil operates relay. Write for complete information.

"Pioneers in Push-Button Science"

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DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
PITTSBURGH 18, PENNSYLVANIA

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RELAYS, Demand Totalizing
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Varo Mfg Co
Waugh Engrg Co
Wheelock Signals Inc

RELAYS, Galvanometer
Corbett Science Labs
Federal Pacific
Weston Instruments

RELAYS, Heavy Duty (Rating 30 amp or above)
Advance Relays
Automatic Switch Co
B/W Controllers
Cutler-Hammer
Ebert Electronics
Electric Auto-Lite
Electric Regulator
Energy Kontrols
General Controls
GE Apparatus Sales Div
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A clear and thorough treatment of the practical aspects of automation—the application of the instrument to the process. Covers: plant controllability; measuring and transfer lags; controller operation; valve characteristics; and disturbance effects. Include many examples. 380 pages + XVIII, cloth 5¾" x 8¾"

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STEPPING SWITCHES

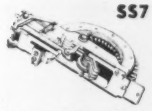
WESTERN ELECTRIC

5 Level 22 Position Gold Plated Wipers

SS6

Mfd. by Western Electric; 22 step; 5 levels; Bridging wipers; Contacts: Gold plated brass. Interrupter Switch: 1 Break-Make; Net Weight: 2 lb 2 oz. "Homing" type; 180° wipers; Step in one direction. Single coil.

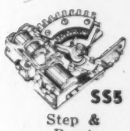
	ea
#R926; 6 to 12 VDC	13.75*
#R980; 24 to 36 VDC	14.75*
#R981; 48 to 60 VDC	15.75*
#R615; 100 to 125 VDC	16.75*



SS7

Mfd. by Western Electric; 44 step; 2 circuits; Bridging Wipers; Contacts: Gold plated brass; Interrupter switch: 1 break-make; Net weight: 1 lb 14 oz; "Homing" type; 360° wipers; Single coil; Step in one direction.

	ea
#R927; 6 to 12 VDC	13.75*
#R982; 24 to 36 VDC	14.75*
#R983; 48 to 60 VDC	15.75*
#R616; 100 to 125 VDC	16.75*



SS5

Step & Reset

Minor Switch 10 steps and off. Contacts: Nos. R960 975, 976 Gold plated brass; Bridging wiper; Others—beryllium-copper. Nonbridging wiper; 2 coils, step and reset; Net Wt: 1 lb.

Volts DC	1 level Stk#	Price*	3 level Stk#	Price*
6- 12	R960	9.50	R642	11.50
24- 36	R975	10.50	R600	12.50
48- 60	R976	11.50	R645	13.50
100-125	R643	12.50	R646	14.50

Off-normal springs; 1A, 1B; #ONS1 ..... 1.00 extra
(Please specify if required)

FTR TYPE 30; "Homing" type; Single coil; Step in one direction; Beryllium copper arms and contacts; 1B. interrupter spring.

4 Circuit; 30 Positions; 1 Bridging, 3 non-bridging wipers; 1 D (make before break) off-normal spring; Net weight 2 lb.

#R1668 6 to 12 VDC	20.00*
#R1669 24 to 36 VDC	20.00*
#R1670 48 to 60 VDC	20.50*
#R1671 100 to 125 VDC	21.00*

CLARE TYPE 20: "Homing" type; Single coil; Step in one direction; 180° wipers; 20 position: 8 levels, 2 bridging, 6 non-bridging; Phosphur bronze arms and contacts; 1A, 1B. interrupter springs. Net weight 22 oz.

#R1645 6 to 12 VDC	20.00*
#R1646 24 to 36 VDC	20.00*
#R1647 48 to 60 VDC	20.50*
#R1648 100 to 125 VDC	21.00*

SEND FOR LATEST CATALOG I.C.S.

FRAHM FREQUENCY SENSITIVE RELAYS

Resonant reed relays permit the transmission of a number of control signals over a signal wire, carrier or radio circuit. Since a given resonant relay will respond only to a narrow band of frequencies, it is possible to operate a number of relays simultaneously by making use of an equal number of source generators arranged so that none of the operating frequency bands overlap. In the range 200-500 cycles it is possible to operate up to sixteen channels with no interference between channels. 15 frequencies available. All 116 turns, 0.4 ohms d-c:

AVAILABLE FREQUENCIES (CPS)

200.0	240.2	286.6	346.6	416.3
212.6	255.4	306.7	369.3	470.5
226.0	271.3		391.8	

FRAHM RESONANT REED RELAY
(Specify Frequency) 6.00 ea.*

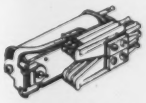
PLUG-IN SEALED RELAYS

POTTER BRUMFIELD SM-TERADIO 6000-BABCOCK BR1

Small (¾" dia x 1-¾"lg), SPDT light weight, hermetically sealed relay in cylindrical shell with 7-pin miniature base.

Stock #	Mfgr #	Volts DC	Ohms	Contact Amps	Case	Ea*
R2552	P&B SM	1 amp	2	½	Metal	3.00
R1337	P&B SM	24	380	½	Glass	2.00
R1338	P&B SM	4.5ma	9000	½	Glass	3.75
R1340	P&B SM	24	900	½	Metal	3.25
R2553	P&B SM	5ma	3500	½	Metal	3.75
R1795	P&B SM	3.8ma	5000	½	Metal	4.00
R822	P&B SM	70	5000	½	Metal	3.25
R2554	P&B SM	3.7ma	8000	½	Metal	4.00
R1441	P&B SM	3 ma	10000	½	Metal	4.00
R1705	Teradio	3 ma	5000	1	Metal	4.50
R2556	Babcock	3.9ma	9000	2	Metal	4.75

TELEPHONE TYPE RELAYS



LONG TYPE

The Telephone Type Relay is the basic all-purpose relay. It is suitable, in its various modifications, for the majority of all applications. It may be mounted in any position and operation is not affected by reasonable vibration. Manufacturing facilities available to us enable us to give prompt delivery of these types of relays in any quantity to your specification. In addition, we have a large supply of interchangeable coils and frames in stock. Let us quote on your requirements.

SMALL TYPE—Compact, versatile, multiple contact, vibration and shockproof, these relays are approximately half the size of the more familiar long telephone type. They are similar to the latter in design and operation. Clare type J, Automatic Electric type E, and Phillips type 8QA are included in this group.

MERCURY WETTED CONTACT RELAYS

A Billion Operations

LONG LIFE: Conservative life expectancy of over a billion operations when operated within ratings.

HIGH SPEED: Give consistent performance at speeds up to 60 operations per second.

HIGH CURRENT: and voltage-handling capacity (up to 5 amperes, and up to 500 volts).

UNIFORMITY: Operating time varies by only about 0.1 millisecond under constant drive conditions.

CHATTER-FREE: Mercury dampens armature vibration and bridges mechanical chatter between metal contact surfaces.

CLARE HGP1010: SPDT, Double break (1W); 2 coils: 1020 and 970 ohms; High pressure, hydrogen sealed; Octal plug base. Operates with 15 ma on either coil; Magnetic bias for operation between narrow limits. #R1026 ..... 8.75*

WESTERN ELECTRIC 275C: SPDT, double break; 2 coils, 3300 & 700 ohms; Operating current, windings in series 6.6 ma, release 5.2 ma; #R2551 ..... 8.75*

WESTERN ELECTRIC 276A: SPDT, double break (1W); 90 ohm; Operating current: 16.0 ma; Release 1.3. Magnetic bias; Positive potential must always be applied to start of winding. #R1027 ..... 8.75*

WESTERN ELECTRIC D171584: (Equivalent to 275B); SPDT; 1 coil, 4500 ohm, plus 24 V. heater; relay operating current 8.0 ma. Release current 5.2 ma. The heater is enclosed within the housing to assure uniform high-speed operation even at sub-zero temperatures. #R1021. ..... 8.75*

WESTERN ELECTRIC D168479: (Equivalent to 275C); SPDT 2 coils, 3300 & 700 ohms; Operating current, windings in series, 6.6 ma; release 5.2. #R1022 ..... 8.75*

WESTERN ELECTRIC GA50143: SPDT; 2 coils, 3300 & 700 ohm; Operating current with coils in series: 6.0 ma; Release 3.4 ma. Same as R1022 except more sensitive. #R1019 9.00*

WESTERN ELECTRIC 163781: High speed dry complement to the mercury relay. SPST; 2500 ohm; 24VDC; minimum operating current: 4 ma; Release, 2.9 ma. #R1028 ..... 7.50*

WRITE OR PHONE WAlker 5-9257
FOR YOUR RELAY REQUIREMENTS

We have a variety of standard type of relays. When inquiring concerning your needs, give as much information as possible.

ALL MERCHANDISE IS GUARANTEED AND MAY BE RETURNED FOR FULL CREDIT.

Prices listed with asterisk (*) are subject to QUANTITY DISCOUNTS

1-9	as quoted	50-99	15%
10-49	10%	over 100	20%

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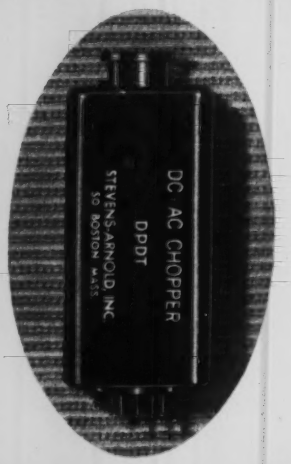


DC-AC CHOPPERS

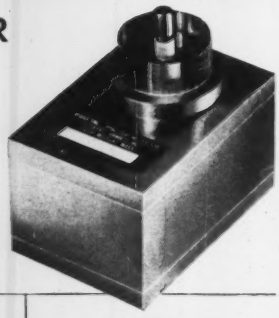
For 50/60/94/120 Cycle Use

There are twenty-two miniature types, both single and double pole, built to rigid commercial specifications with the emphasis on long life, low noise level, and extreme reliability. Please write for Catalog 515.

MICROVOLT MODULATORS

VIBRATING CAPACITOR

A vibrating-reed type capacitance modulator used to measure currents as low as 10^{-16} amperes. Drift never exceeds ±0.2 millivolts per day, noncumulative. Thus it is ideal where stable performance without recalibration is required for periods of a month or more. Write for Catalog 523.



ULTRA HIGH SPEED RELAYS

Operating time 200 microseconds. Mount in any position. Will cover the range of —65°C to +85°C factory sealed. Please write for Catalog 337.

0-500 CYCLE DC-AC CHOPPERS

Liberal factors of safety. Before any Chopper is shipped, it is tested twice over the range of —65°C to +85°C to give double proof of stamina. Please write for Catalog 280.

RESONANT RELAYS

Permit remote control by radio or carrier through frequency discrimination. Relays operate only when energized at rated frequencies and reject all others. Please write for Catalog 335.

STEVENS-ARNOLD

INCORPORATED

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Automatic Electric
Automatic Timing & Contls
Automation Controls Corp
Barber-Colman
Biddle Co James G
Clare & Co C P
Comar Electric
Curtiss Wright
Cutler-Hammer
Dialtron Corp
Ebert Electronics
Edison Industries T A
Electric Regulator
Electronic Computer Co
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Filtors Inc
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Kurman Electric Co
Leach Corporation
Leland Inc G H
Luther Mfg Co
Magnecraft Electric
Mallory & Co P R
McIlvaine O T
Metals & Controls Div
M-H Marion Instr Div
Naybor Labs E V
Networks Elx Corp
North Electric Co
Philadelphia Scien Glass
Pollak Corp Jos
Potter & Brumfield
R-B-M Controls Div
Relay Sales Inc
Relay Service Co
Ritzon Electronics
Sigma Instruments
Stevens-Arnold
Union Switch & Signal
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Weston Instruments
Wheelock Signals Inc

RELAYS, Instrument Controlled

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Automatic Electric
Automatic Switch Co
Automatic Timing & Contls
Automation Controls Corp
Brach Mfg Corp
Clare & Co C P
Durakool Inc
Ebert Electronics
Edison Industries T A
Electric Regulator
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General Automatic
Gulton Industries
Hillburn Electronic
James Vibrapowr Co
Kurman Electric Co
Larson Instrument
Leach Relay
Millivac Instr Div
North Electric Co
Pollak Corp Jos
Powers Regulator
Relay Sales Inc
Relay Service Co
Simpson Electric
Stevens-Arnold
Victory Engrg Corp
Ward Leonard Electric
Westinghouse Electric
Weston Instruments

RELAYS, Mercury (see also Switches, Mercury)

Allied Control Co
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Durakool Inc
Ebert Electronics
Energy Kontrols
Gordos Corp
H-B Instrument
Mack Electric Devices
McIlvaine O T
Mercoid Corp
Philadelphia Scien Glass
Relay Sales Inc

RELAYS, Mercury Tube

Berneo Engrg Corp
Ebert Electronics
Gordos Corp
H-B Instrument
Mack Electric Devices
Mercoid Corp
Philadelphia Scien Glass
Relay Sales Inc

RELAYS, Motor Driven, Time Delay

Abrams Instrument
Advance Relays
Alina Corp
Allen-Bradley
Cramer Controls
Curtiss Wright
Eagle Signal
Ebert Electronics
GE Apparatus Sales Div
Hamilton Watch Co
Haydon Co A W
Industrial Timer Corp
Kurman Electric Co
Leach Relay
North Electric Co
Relay Sales Inc
Westinghouse Electric

RELAYS, Movable Coil AC

Advance Relays
Federal Pacific
Hillburn Electronic
Kurman Electric Co
North Electric Co
Relay Sales Inc

RELAYS, Overload

Advance Relays
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Allied Control Co
Allis Chalmers
Amer Klueckner-Moeller
Assembly Products Inc
Automatic Switch Co
Clare & Co C P
Clark Controller
Comar Electric
Cutler-Hammer
E-T-A Products
Ebert Electronics
Electric Regulator
Filtors Inc
G-V Controls
General Automatic
GE Apparatus Sales Div
General Railway Signal
Hughes Products
Jennings Radio Mfg
Kurman Electric Co
Larson Instrument
Leach Relay
Magnecraft Electric
Metals & Controls Div
Naybor Labs E V
North Electric Co
Opad Electric
Pollak Corp Jos
R-B-M Controls Div
Relay Sales Inc
Sigma Instruments
U S Relay Co
Ward Leonard Electric
Weston Instruments
Wheelock Signals Inc

RELAYS, Permanent-Magnet Movable Coil (D'Arsonval Type)

Assembly Products Inc
Automatic Switch Co
Federal Pacific
Kurman Electric Co
Larson Instrument
North Electric Co
Triplett Electl Instr
Weston Instruments

RELAYS, Photoelectric

Allied Radio
Autotron Inc
Berkeley Dynamics
Clark Controller
Comar Electric
Edison Industries T A
Energy Kontrols
Farmer Electric
GE Apparatus Sales Div
Kurman Electric Co
Machinery Electrification
McIlvaine O T
Photobell Co
Photomation Inc
R-B-M Controls Div
Relay Service Co
Sigma Instrument
Tri-Tronics Co
Victory Engrg Corp
Weston Instruments
Worner Electronic Devices

RELAYS, Pneumatic

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Bailey Meter Co
Berneo Engrg Corp
Black Sivalls & Bryson
Conoflow
Eagle Signal
General Regulator
Hagan Chem & Controls
Moore Products Co
North Electric Co
Powers Regulator
Taylor Instrument

RELAYS, Polarized

Advance Relays
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Automatic Electric
Barber-Colman
Bristol Co
Clare & Co C P
Clark Controller
Edison Industries T A
Electric Regulator
GE Apparatus Sales Div
General Railway Signal
Hart Mfg Co
Hillburn Electronic
James Vibrapowr Co
Kurman Electric Co
Larson Instrument
Leach Corporation
Luther Mfg Co
North Electric Co
Potter & Brumfield
Relay Sales Inc
Sigma Instruments
Stevens-Arnold
U S Relay Co
Wheelock Signals Inc

RELAYS, Power

Advance Relays
Allied Control Co
Automatic Electric
Automatic Switch Co
Automation Controls Corp
Clare & Co C P
Clark Controller
Comar Electric

LOOK TO LEACH

RELIABLE RELAYS
Miniature • Sub-miniature • Contactors

INTELLIGENT RELAYS
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CIRCLE 327 ON READER-SERVICE CARD

Cutler-Hammer
Durakool Inc
Ebert Electronics
Electric Regulator
Energy Kontrols
Filtors Inc
GE Apparatus Sales Div
Globe Electrical
Hart Mfg Co
Hillburn Electronic
James Vibrapowr Co
Leach Corporation
Kurman Electric Co
Mack Electric Devices
Magnecraft Electric
McIlvaine O T
Molex Products
Naybor Labs E V
North Electric Co
Pollak Corp Jos
R-B-M Controls Div
Relay Sales Inc
Sigma Instruments
Potter & Brumfield
Unit Process Assemblies
U S Relay Co
Victory Engrg Corp
Ward Leonard Electric
Welch Electric
Wheelock Signals Inc

RELAYS, Sensitive

Advance Relays
Allied Control Co
Assembly Products Inc
Automatic Electric
Automatic Switch Co
Automation Controls Corp
Barber-Colman
Baso Inc
Comar Electric
Corbett Science Labs
Cutler-Hammer
Ebert Electronics
Edison Industries T A
Electric Regulator
Federal Pacific
General Automatic
GE Apparatus Sales Div
General Railway Signal
Globe Electrical
H-B Instrument
Hart Mfg Co
Hillburn Electronic
Hughes Products
Iron Fireman Elx Div
Jaidinger Mfg
Kurman Electric Co
Larson Instrument
Leach Corporation
Mack Electric Devices
Magnecraft Electric
Molex Products
North Electric Co
Opad Electric
Philadelphia Scien Glass
Pollak Corp Jos
Potter & Brumfield
Precision Thermometer
Reisner Mfg Co W H
Relay Sales Inc
Relay Service Co
Sigma Instruments
Union Switch & Signal
U S Relay Co
Victory Engrg Corp
Ward Leonard Electric
Warrick Co Chas F
Weston Instruments
Wheelock Signals Inc

RELAYS, Stepping

Automatic Electric
Clare & Co C P
Corbett Science Labs
Cunningham Son & Co
GE Apparatus Sales Div
General Railway Signal
Hillburn Electronic
Leland Inc G H
Land-Air Inc
North Electric Co
Potter & Brumfield
Relay Sales Inc
Sigma Instruments
Stromberg-Carlson Co

RELAYS, Subminiature

Advance Relays
Aero Electronics
Allied Control Co
Amerelay Corp
Automation Controls Corp
Baso Inc
Clare & Co C P
Comar Electric
Dialtron Corp
Filtors Inc
GE Apparatus Sales Div
Gulton Industries
Hart Mfg Co
Hillburn Electronic
Hufco Industries
Hughes Products
Iron Fireman Elx Div
Jaidinger Mfg
Kurman Electric Co
Leach Corporation
Luther Mfg Co
Magnecraft Electric
Naybor Labs E V
North Electric Co
Potter & Brumfield
Relay Sales Inc
Sigma Instruments
Union Switch & Signal
U S Relay Co
Victory Engrg Corp
Wheelock Signals Inc

RELAYS, Telephone, Auxiliary Ringing

Advance Relays
Allied Control Co
Automatic Electric
Automation Controls Corp
Comar Electric
General Automatic
GE Apparatus Sales Div
Globe Electrical
Hillburn Electronic
Hufco Industries
Kurman Electric Co
North Electric Co
Potter & Brumfield
R-B-M Controls Div
Relay Sales Inc
Stromberg-Carlson Co
U S Instrument Corp
U S Relay Co
Wheelock Signals Inc

RELAYS, Temperature

Advance Relays
Baso Inc
Blue M Electric
Dialtron Corp
E-T-A Products
Electric Regulator
General Automatic
GE Apparatus Sales Div
Hughes Products
Kurman Electric Co
Larson Instrument
Lewis Engrg Co
Magnecraft Electric
Philadelphia Scien Glass
Pollack Corp Jos
Powers Regulator
Sigma Instruments
Victory Engrg Corp

RELAYS, Temperature-compensated

Advance Relays
Baso Inc
Curtiss Wright
Edison Industries T A
Electric Regulator
G-V Controls
General Automatic
GE Apparatus Sales Div
Globe Electrical
Luther Mfg Co
Pollak Corp Jos
Sigma Instruments
U S Relay Co
Victory Engrg Corp

RELAYS, Time Delay

A'G'A' Division
Abrams Instrument
Advance Relays
Allied Control Co
Alto Scientific
Amperite Co
Anadex Instruments Inc
Automatic Electric
Automatic Switch Co
Automatic Timing & Contls
Automation Controls Corp
Baso Inc
Clare & Co C P
Clark Controller
Comar Electric
Cramer Controls
Curtiss Wright
Cutler-Hammer
Dialtron Corp
Durakool Inc
E-T-A Products
Eagle Signal
Ebert Electronics
Edison Industries T A
Energy Kontrols
G-V Controls
General Automatic
General Controls
GE Apparatus Sales Div
General Railway Signal
Globe Electrical
Hamilton Watch Co
Haydon Co A W
Hughes Products
Industrial Timer Corp
Jaidinger Mfg
Kurman Electric Co
Larson Instrument
Leach Corporation
Machinery Electrification
Magnecraft Electric
Master Specialties
McIlvaine O T
Naybor Labs E V
North Electric Co
R-B-M Controls Div
Relay Sales Inc
Rhodes Inc M H
Syracuse Electronics
Tempo Instrument
United Control Corp
U S Instrument Corp
U S Relay Co
Victory Engrg Corp
Waugh Engrg Co
Westinghouse Director Sys
Westinghouse Electric
Wheelock Signals Inc
Wilson & Co G C

RELAYS, Transformer, Low Voltage

Advance Relays
Automatic Timing & Contls
B/W Controllers
Ebert Electronics
G-V Controls
General Controls
Gulton Industries
Kurman Electric Co
Mercoid Corp
North Electric Co
Warrick Co Chas F

RELAYS, Vacuum Contact

Allied Control Co
Ebert Electronics
Eitel-McCullough
GE Apparatus Sales Div
Jennings Radio Mfg
Mack Electric Devices
Philadelphia Scien Glass

RELAYS, Vibrating Reed Type

Automatic Electric
Biddle Co James G
Bulova Research
Electronic Computer Co
Jaidinger Mfg
North Electric Co
Stevens-Arnold

RESISTORS, Adjustable

Allen-Bradley
Bourns Inc
Centralab Div
Clark Controller
Clarostat Mfg
Electric Regulator
International Resistance
Mallory & Co P R
Precision Inc
Precision Linw Inc
Rex Rheostat
Ward Leonard Electric

RESISTORS, Deposited Carbon

Aerovox Corp
Amperite Co
Centralab Div
Clarostat Mfg
Corning Glass
Electra Mfg
Erie Resistor
International Resistance
Mallory & Co P R
Optical Coating Lab

RESISTORS, Ballast

Clarostat Mfg
Ohio Carbon Co
Precision Resistor Co

RESISTORS, Carbon Composition and/or Variable

Aero Electronics
Aerovox Corp
Allen-Bradley
Centralab Div
Clarostat Mfg
Erie Resistor
International Resistance
Mallory & Co P R
Ohio Carbon Co
Reon Resistor Corp
Stackpole Carbon
White Dental Mfg

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Allen-Bradley
Centralab Div
Clarostat Mfg
Corning Glass
Daven Co
Dawcon Corp
Dmeter Mfg
Electra Mfg
Electro Instruments
Erie Resistor
General Resistance
Gordos Corp
International Resistance
Julie Research Labs
Kelvin Electric
Mallory & Co P R
Non-Linear Systems
Precision Inc
Precision Resistor Co
Reon Resistor Corp
Shallcross Mfg Co
Ultronix Inc
Weston Instruments

RESISTORS, High Frequency
Aerovox Corp
Clarostat Mfg
Corning Glass
Electra Mfg
International Resistance
Julie Research Labs
Mallory & Co P R
Transformers Inc
Weston Instruments

RESISTORS, High Megohm
Allen-Bradley
Centralab Div
Clarostat Mfg
Corbett Science Labs
Daven Co
Julie Research Labs
K-F Development
Kelvin Electric
Reon Resistor Corp
Shallcross Mfg Co
Weston Instruments
White Dental Mfg

RESISTORS, High Voltage
Centralab Div
Clarostat Mfg
Corbett Science Labs
Corning Glass
International Resistance
Julie Research Labs
K-F Development
Mallory & Co P R
Precision Resistor Co
Ram Meter Inc
Shallcross Mfg Co
Weston Instruments
White Dental Mfg

RESISTORS, Manganin
Daven Co
Dmeter Mfg
General Resistance
Gray Instrument
Industrial Instruments
Julie Research Labs
K-F Development
Kelvin Electric
M-H Rubicon Instrs Div
Precision Inc
Precision Resistor Co
Ram Meter Inc
Reon Resistor Corp
Rince Inc
Shallcross Mfg Co
Weston Instruments
Winslow Company Inc

RESISTORS, Molded
Aerovox Corp
Allen-Bradley
Clarostat Mfg
Daven Co
Electra Mfg
General Resistance
International Resistance
Julie Research Labs
K-F Development
Precision Resistor Co
White Dental Mfg

RESISTORS, Negative Temperature Coefficient
Aerovox Corp
Daven Co
Dmeter Mfg
Electra Mfg
GE Magnetic Materials
General Resistance
Kelvin Electric
Victory Engrg Corp

RESISTORS, Noninductive
Aerovox Corp
Allen-Bradley
British Industries
Clarostat Mfg
Corning Glass
Daven Co
Dmeter Mfg
Electra Mfg
Electro Instruments
General Radio
General Resistance
Gray Instrument
Industrial Instruments
Julie Research Labs
K-F Development
Kelvin Electric
Precision Inc
Precision Resistor Co
Reon Resistor Corp
Resistors Inc
Rex Rheostat
Rince Inc
Shallcross Mfg Co
States Company
Ward Leonard Electric
Weston Instruments

RESISTORS, Precision (accuracy better than 1%)
Aerovox Corp
Allen-Bradley
British Industries
Corbett Science Labs
Clarostat Mfg
Corning Glass
Daven Co
Dmeter Mfg
Electra Mfg
Electro Instruments
Electro-Measurements
Electronic Applications
Erie Resistor
General Radio
General Resistance
General Transistor
Gray Instrument
Industrial Instruments
International Resistance
Julie Research Labs
K-F Development
Kelvin Electric
Leeds & Northrup
M-H Rubicon Instrs Div
Mallory & Co P R
Muirhead Instrs Inc
Networks Elx Corp
Non-Linear Systems
Precision Inc
Precision Line Inc
Precision Resistor Co
Reon Resistor Corp
Sage Electronics
Shallcross Mfg Co
Transformers Inc
Weston Instruments
Ultronix Inc
Winslow Company Inc

RESISTORS, Tape
International Resistance
K-F Development

RESISTORS, Wire Wound (2 watts and under)
Aero Electronics
Aerovox Corp
Carol Electronics
Centralab Div
Clarostat Mfg
Daven Co

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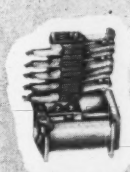

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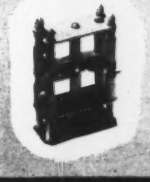

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General Resistance
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Gray Instruments
Hardwick Hindle
Industrial Instruments
International Resistance
Julie Research Labs
K-F Development
Kelvin Electric
Mallory & Co P R
M-H Rubicon Instrs Div
Model Engrg
Muirhead Instrs Inc
Non-Linear Systems
Precision Inc
Precision Line Inc
Precision Resistor Co
Reon Resistor Corp
Rinco Inc
Sage Electronics
Shallcross Mfg Co
Ultronix Inc
Weston Instruments

RESISTORS, Wire Wound (2 to 500 watts) (see also Rheostats)

Aero Electronics
Centralab Div
Clark Controller
Clarostat Mfg
Dmeter Mfg
GE Apparatus Sales Div
General Radio
Hardwick Hindle
International Resistance
Mallory & Co P R
Microloc Corp
Model Engrg
Ohio Carbon Co
Precision Inc
Ram Meter Inc
Resistors Inc
Rex Rheostat
Sage Electronics
Shallcross Mfg Co
Ward Leonard Electric
Weston Instruments

RESISTORS, Wire Wound (500 to 1500 watts) (see also Rheostats)

Clark Controller
GE Apparatus Sales Div
International Resistance
Model Engrg
Ram Meter Inc
Rex Rheostat
Ward Leonard Electric
Westinghouse Electric
Weston Instruments

RESISTORS, Woven

Clarostat Mfg
States Company

RETICLES

Bushnell & Co D P
Leroy M E Clausing
Levy & Co Max
Palos Optical Co
Photoplating Co
Renick Co L C
Zenith Optical Lab

RHEOSTATS, Field

Clark Controller
Clarostat Mfg
Cutler-Hammer
GE Apparatus Sales Div
Mallory & Co P R
Ward Leonard Electric
Westinghouse Electric

RHEOSTATS, Slide Wire and Variable (see also Resistors)

Aero Electronics
Allen-Bradley
Biddle Co James G
Bourns Inc
Clarostat Mfg
DeJur-Amsco
General Controls
General Radio
Hardwick Hindle
Mallory & Co P R
Model Rectifier
Precision Line Inc
Rex Rheostat
Rinco Inc
Supervisor Electric Co
Ward Leonard Electric
Welch Scientific
Westinghouse Electric

SCALES, Instrument

American Laubscher
Bushnell & Co D P
Crename Inc
Engis Equipment
Gaertner Scientific
Gurley W & L E
Levy & Co Max
Metalphoto Corp
Photoplating Co
Renick Co L C
Sensitive Research Instr
U S Radium Corp
Waldom Electronics

SOLENOIDS, (see also Relays)

Allen-Bradley
Applied Dynamics
Automatic Electric
Automatic Switch Co
B/W Controllers
Carruthers & Fernandes
Comar Electric
Controls Co of Amer
Cunningham Son & Co
Cutler-Hammer
Detroit Coil Co
GE Apparatus Sales Div
Induction Motors Corp
Kintronic Div
Koontz-Wagner Elec
Leetronics Inc
P S P Engrg Co
Pollak Corp Jos
R-B-M Controls Div
Relay Sales Inc
Synchro-Start
U S Relay Co
Welch Electric
Weston Hydraulics Ltd

SOLENOIDS, Rotary

Carruthers & Fernandes
Curtiss-Wright
Land-Air Inc
Leetronics Inc
Leland Inc G H
Pacsol Div
Relay Sales Inc

SOLENOIDS, Subminiature

Cannon Electric
Carruthers & Fernandes
Comar Electric
Controls Co of Amer
Cunningham Son & Co
Induction Motors Corp
Kintronic Div
Koontz-Wagner Elec
Leetronics Inc
Pollak Corp Jos
P S P Engrg Co
Relay Sales Inc

STANDARD CELLS

Eppley Laboratory
International Rectifier
Muirhead Instrs Inc
North Hills Electric
Sensitive Research Instr
Winslow Company Inc

SWITCHES, Air Operated

Aero Division
Bristol Co
Carruthers & Fernandes
Calvin Labs
Consol Controls
Dietz Co Henry G
Electric Regulator
Fairchild Controls
Furnas Electric
GE Apparatus Sales Div
Gern Electric
Haydon Switch Inc
Johnson Service Co
Linear Controls
Mercoid Corp
Newark Controls
Powers Regulator
Rotary Devices Corp
Westinghouse Electric

SWITCHES, Instrument, Including Wiping, Selecting, etc

Aerovox Corp
Applied Science Corp
Automatic Electric
Automatic Metal Prods
Centralab Div
Clarostat Mfg
Cunningham Son & Co
Cutler-Hammer
Daven Co
Digitran Co
Electric Regulator
Electro Development
Electrosnap
Federal Pacific
General Devices
Grayhill Inc
Hughes Products
Industrial Instruments
Land-Air Inc
Lewis Engrg Co
Lind Corp
Mallory & Co P R
M-H Micro Switch Div
Model Engrg
Muirhead Instrs Inc
North Electric Co
Pollak Corp Jos
Poly-Scientific Corp
Relay Sales Inc
Rotary Devices Corp
Shallcross Mfg Co
Taurus Corp
Thermo Electric
U S Instrument Corp

SWITCHES, Magnetic

Aero Division
Allen-Bradley
Automatic Electric
Clark Controller
Cutler-Hammer
E-T-A Products
Ebert Electronics
Electrosnap
Furnas Electric
General Devices
GE Apparatus Sales Div
Gordos Corp
Hamlin Inc
Hughes Products
Mercoid Corp
Molex Products
Murphy Mfg Inc
North Electric Co
Philadelphia Scien Glass
Post Electronics
Rotary Devices Corp

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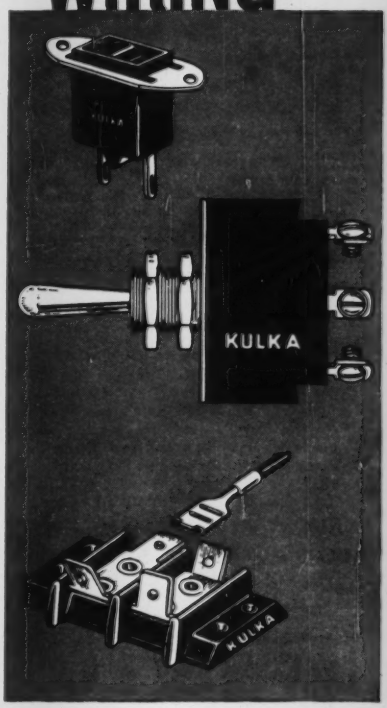

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Zenith Electric

SWITCHES, Mercury

Almo Mfg Co
Automatic Electric
Bernco Engrg Corp
Durakool Inc
Ebert Electronics
Energy Kontrols
General Controls
General Devices
Gordos Corp
H-B Instrument
McIlvaine O T
Mercoid Corp
M-H Micro Switch Div
Newark Controls
Philadelphia Scien Glass

SWITCHES, Pressure and Vacuum

Acro Division
Allen-Bradley
Barksdale Valves
Bristol Co
Burton Mfg Co
Century Elx & Instrs
Coleman Engrg
Consol Controls
Controls Co of Amer
Cooper Development
Cutler-Hammer
Detroit Controls
Dietz Co Henry G
Dwyer Mfg F W
Ebert Electronics
Ellison Draft Gage
Furnas Electric
General Controls
General Devices
GE Apparatus Sales Div
Giannini Controls Corp
Gorn Electric
Haydon Switch Inc
Helicoid Gage Div
Hobbs Corp John W
Jennings Radio Mfg
Mallory & Co P R
Mason-Neilan
Mercoid Corp
Moore Products Co
Murphy Mfg Inc
Newark Controls
Rochester Div CEC
United Electric Controls
U S Gauge Div
Vickers-A & E Center

SWITCHES, Pyrometer

Barber-Colman
Bristol Co
General Devices
Illinois Testing Labs
Leeds & Northrup
M-H Brown Instrs Div
Thermo Electric
West Instrument
Winslow Company Inc

SWITCHES, Rotary, Including Shaft Motion Types

Allied Radio
Allis-Chalmers
Applied Science Corp
Automatic Electric
Breeze Corporations
Centralab Div
Collectron Corp
Controls Co of Amer
Cushman Precision Ind
Cutler-Hammer
Daven Co
Digitran Co
Eagle Signal
Eastern Specialty Co
Electric Regulator
Electro Development
Electro-Miniatures
Electrosnap
Electro Switch
Federal Pacific
Furnas Electric
General Devices
GE Apparatus Sales Div
Graphite Metallizing
Grayhill Inc
Hart Mfg Co
Hughes Products
Industrial Instruments
Instr Development Labs
J-B-T Instruments
Land-Air Inc
Leeds & Northrup
Lewis Engrg Co
Lind Corp
Mallory & Co P R
M-H Micro Switch Div
Muirhead Instrs Inc
Norman Hardy Assoc
North Electric Co
Oak Mfg Co
Pollak Corp Jos
Poly-Scientific Corp
Precision Line Inc
Relay Sales Inc
Rixon Electronics
Rodale Mfg Co
Shallcross Mfg Co
Sigma Instruments
Slip Ring Co
Spectrol Electronics
Stackpole Carbon
Standard Electrical Prods
Rotary Devices Corp
U S Instrument Corp

SWITCHES, Sealed

Automatic Electric
Control Products
Cushman Precision Ind
Cutler-Hammer
Daven Co
Durakool Inc
Ebert Electronics
Electrosnap
Energy Kontrols
General Controls
General Devices
Hart Mfg Co
Haydon Switch Inc
Inertia Switch Inc
Lind Corp
Kulka Electric
McIlvaine O T
Metals & Controls Div
M-H Micro Switch Div
North Electric Co
Oak Mfg Co
Revere Corp of Amer
Rotary Devices Corp
Tapeswitch Corp
United Electric Controls

SWITCHES, Snap Action

Acro Division
Allen-Bradley
Atocon Corp
Control Products
Controls Co of Amer
Cutler-Hammer
Daven Co
Detroit Controls
Ebert Electronics
Electrosnap
Electro Switch
Furnas Electric
General Controls
General Devices
GE Apparatus Sales Div
Grayhill Inc
Hart Mfg Co
Haydon Switch Inc
Inertia Switch Inc
Jaidinger Mfg
Joy Mfg Co
Kay Electric
Kulka Electric
Linear Controls
Mallory & Co P R
Mercoid Corp
Metals & Controls Div
M-H Micro Switch Div
Molex Products
Pass & Seymour
Pollak Corp Jos
Rodale Mfg Co
Thermo Electric Mfg
Torsion Balance Co
Unimax Switch Div
United Elerctic Controls
Vemaline Products

SWITCHES, Stepping, Including Motors, Step Type (see also Relays)

Aerovox Corp
Applied Science Corp
Automatic Electric
Clare & Co C P
Cunningham Son & Co

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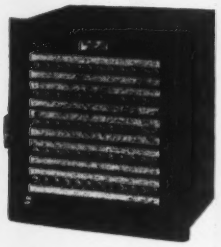
SWITCHING SYSTEMS

For Thermocouples or Resistance Bulb Circuits



Key-Type Switch Unit

T-E's variety of compact, durable switching systems lets you choose the one best suited to your circuit needs.

Rotary Selector Switch "Shorting-type" switches for quick checking or switching of sensing elements. Maximum, 24 points.

Key Switches Will connect many sensing elements to one instrument or transfer them from one instrument to another. Maximum, 144 points.

Push Button Switches Permit on-off checking or averaging of temperatures from many points. Maximum 72 points.

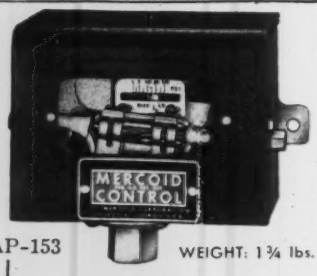
Quick-Coupling Connector Panels Provide great flexibility in transferring large numbers of thermocouples. Unlimited Capacities.

Also a wide selection of quick-coupling plugs and jacks for all thermocouple assemblies.

Write for Bulletin 24-FF

Thermo Electric Co. Inc.
Saddle Brook, New Jersey
In Canada—
Thermo Electric (Canada) Ltd., Brampton, Ont.
CIRCLE 334 ON READER-SERVICE CARD

NEW
SMALL, LIGHTWEIGHT
PRESSURE CONTROL



AP-153 WEIGHT: 1¾ lbs.

FOR MEDIUMS NOT INJURIOUS TO STEEL OR SILVER SOLDER

EXTERNAL ADJUSTMENT

CALIBRATED DIAL

HERMETICALLY SEALED MERCURY SWITCH

VISIBLE CIRCUIT

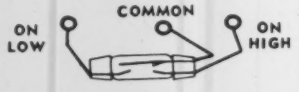
CASE: NEMA 1—Heavy gauge steel, cadmium plated. Steel cover (with glass front).

OPERATING RANGE

Adjustable Operating Range	Differential Fixed (Factory Set)	Maximum Surge Limits
1 to 20 psig	0.5 psig.	30 psig.

CIRCUIT

SP-DT HERMETICALLY SEALED MERCURY SWITCH (4A. 115V., 2A. 230V.)



Provides any of following operations:

1. *Single Pole—Cut-in high (close on rise)*
2. *Single Pole—Cut-in low (open on rise)*
3. *Single Pole—Double Throw*

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Zenith Electric

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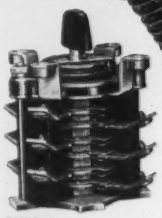
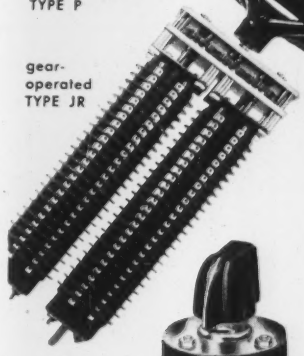


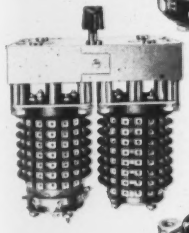
TYPE JR

TYPE P



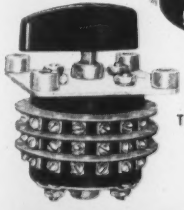
gear-operated TYPE JR

TYPE A/AF



geared pair TYPE HT

TYPE JS-JD



TYPE HT

ESCO standard components are assembled to meet your requirements.

A deviation from one of our standard switch assemblies will give you a *special switch* at a standard-switch cost.

Over 90% of our production is *special* in one way or another.

These standard switches can be modified to fit your application:

- *Type A* — up to 8 positions, 7 sections maximum, detent mechanism, rating 5 amp. 125 volts a-c/30 volts d-c.
- *Type AF* — up to 8 positions, 6 sections maximum, detent action, rating with resistive load 5 amp. at 28 volts d-c or 115 volts 400 cps, per MIL-S-6807.
- *Type P* — Multi-section, up to 4 positions, snap-action, rating 10 amp. 125 volts a-c, 5 amp. 125 volts d-c, 30, 60, 100, 200 amp. 500 volts a-c, or 250 volts d-c. Can be assembled to meet Specification MIL-S-15291.
- *Type JR* — up to 8 positions, 30 sections maximum, detent action, rating 10 amp. 125 volts a-c, 5 amp. 125 volts d-c.
- *Type JD-JS* — up to 8 positions, 5 sections maximum, detent action or snap action, rating 30 amp. 230 volts a-c.
- *Type HT* — up to 16 positions, 10 sections maximum, detent action, rating 5 amp. 125 volts a-c.
- *Geared-Pair Type HT* — up to 16 positions, 20 sections maximum, detent action, rating 5 amp. 125 volts a-c. A single knob controls two Type HT switches assembled with a gear mechanism.
- *Navy Switches* — to MIL-S-15291 and Bureau of Ships drawings 9000-S6202-73075, 73826, 73827, 73295, 74422, and others.

Write for data sheets on individual switches or complete new catalog on ESCO rotary multipole switches. Send us your requirements and we'll give you full specifications on the ESCO switch that meets *your* need.

ESCO *of* WEYMOUTH
ELECTRO SWITCH CORPORATION
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CIRCLE 338 ON READER-SERVICE CARD

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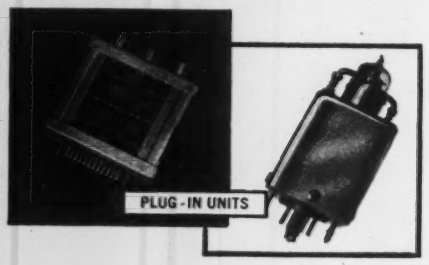

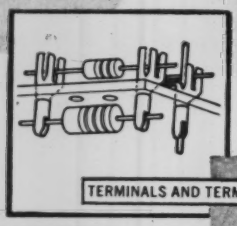

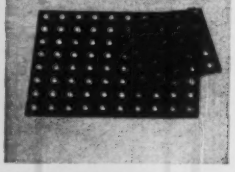

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YOUR COMPLETED CIRCUITS FOR PLUG-IN PACKAGE OR CHASSIS

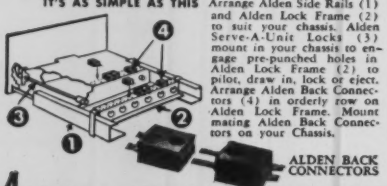
You can use Alden Terminal Mounting Card with Alden Miniature Terminals, Jumper Strip and Sockets staked to accommodate any circuitry — making complete units ready for housing. Components snap into unique Alden Terminals, are held ready for soldering.

2. To mount this vertical circuitry, ALDEN PLUG-IN PACKAGES AND CHASSIS give tremendous variety with standard components

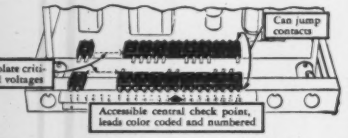
Alden components provide standard plug-in or slide-in housings—with spares, your circuits become units replaceable in 30 seconds.

3. Give chassis easily traceable interconnects and 30-second replacement with ALDEN SERVE-A-UNIT KIT

IT'S AS SIMPLE AS THIS Arrange Alden Side Rails (1) and Alden Lock Frame (2) to suit your chassis. Alden Serve-A-Unit Locks (3) mount in your chassis to engage pre-punched holes in Alden Lock Frame (2) to pilot, draw in, lock or eject. Arrange Alden Back Connectors (4) in orderly row on Alden Lock Frame. Mount mating Alden Back Connectors on your Chassis.



GIVING YOU 1) Chassis that plugs in, locks and ejects with half turn of the wrist. 2) leads so beautifully organized, accessible and identified that non-technical personnel can service.



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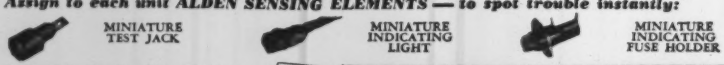

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14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394	
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16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396	
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397	
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398	
19	39	59	79	99	119	139	159	179	199	219	239	259	279	299	319	339	359	379	399	
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5	25	45	65	85	105	125	145	165	185	205	225	245	265	285	305	325	345	365	385	405
6	26	46	66	86	106	126	146	166	186	206	226	246	266	286	306	326	346	366	386	
7	27	47	67	87	107	127	147	167	187	207	227	247	267	287	307	327	347	367	387	
8	28	48	68	88	108	128	148	168	188	208	228	248	268	288	308	328	348	368	388	
9	29	49	69	89	109	129	149	169	189	209	229	249	269	289	309	329	349	369	389	
10	30	50	70	90	110	130	150	170	190	210	230	250	270	290	310	330	350	370	390	
11	31	51	71	91	111	131	151	171	191	211	231	251	271	291	311	331	351	371	391	
12	32	52	72	92	112	132	152	172	192	212	232	252	272	292	312	332	352	372	392	
13	33	53	73	93	113	133	153	173	193	213	233	253	273	293	313	333	353	373	393	
14	34	54	74	94	114	134	154	174	194	214	234	254	274	294	314	334	354	374	394	
15	35	55	75	95	115	135	155	175	195	215	235	255	275	295	315	335	355	375	395	
16	36	56	76	96	116	136	156	176	196	216	236	256	276	296	316	336	356	376	396	
17	37	57	77	97	117	137	157	177	197	217	237	257	277	297	317	337	357	377	397	
18	38	58	78	98	118	138	158	178	198	218	238	258	278	298	318	338	358	378	398	
19	39	59	79	99	119	139	159	179	199	219	239	259	279	299	319	339	359	379	399	
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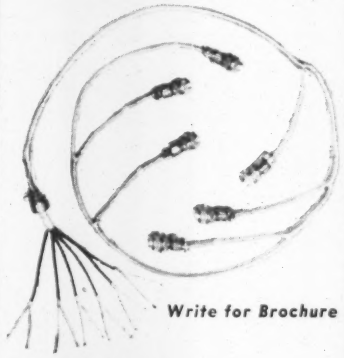
Flexible or semi-flexible—Wrap around or rigid types for accurate measurement of temperatures in aircraft gas turbines, test cells, etc. produced to customer requirements.

▶ **Prototype or production quantities are invited.**



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Transformers Inc
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U S Electronics
United Transformer
Universal Toroid Coil
Varo Mfg Co
Virginia Electronics
Warren Transformer
Wells Electronics

TRANSFORMERS, Instrument including Current, and/or Potential, Laboratory

ACDC Electronics Inc
Allis-Chalmers
American Optical Co
Annis Co R B
Associated Research
Basler Electric
Capitron Div AMP
Calif Magnetic Control
Campbell Co
Coast Coil
Davenport Mfg
Del Electronics
Dietz Design
Durakool Inc
Electrosolids Corp
Esterline-Angus
GE Apparatus Sales Div
Goslin Electric
Hevi Duty Electric
Industrial Transformer
Interelectronics
Kelvin Electric
Kavamil Co
Knopp Inc
Landis & Gyr
Mico Instr Co
Microtran Co
N Y Transformer
Ortho Filter Corp
Pearson Electronics
Ram Meter Inc
Sangamo Electric Co
Specialties Inc
Superior Electric Co
Tech Apparatus Bldrs
Transformers Inc
Trenton Transformer
Universal Toroid Coil
Varo Mfg Co
Virginia Electronics
Warren Transformer
Westinghouse Electric
Weston Instruments

TRANSFORMERS, Insulation Testing

ACDC Electronics Inc
Calif Magnetic Control
Del Electronics
Durakool Inc
Industrial Instruments
GE Apparatus Sales Div
Industrial Transformer
Kavamil Co
Microtran Co
Peschel Electronics
Tech Apparatus Bldrs
Transformers Inc
Trenton Transformer
United Transformer
Virginia Electronics
Warren Transformer

TRANSFORMERS, Isolation

ACDC Electronics Inc
Ameleo Inc
Amplifier Corp of Amer
Audio Development Co
Basler Electric
Calif Magnetic Control
Campbell Co
Carol Electronics
Chicago Std Transformer
Communication Accessories
Del Electronics
Durakool Inc
Elcor Inc
Electrosolids Corp
Freed Transformer
Gates Electronic
Goslin Electric
Green Rectifier
Industrial Transformer
Kavamil Co
Microtran Co
New England Transformer
N Y Transformer
Pacific Instrument Co
Perkin Engrg Corp
Sangamo Electric Co
Specialties Inc
Standard Electrical Prods
Sterling Transformer
Transformers Inc
Trenton Transformer
United Transformer
Varo Mfg Co
Warren Transformer

TRANSFORMERS, Microwave

ACDC Electronics Inc
Airtron Inc
Basler Electric
Communication Accessories
Durakool Inc
Freed Transformer
Goslin Electric
Industrial Transformer
Kavamil Co
P and H Electronics
Perkin Engrg Corp
Stavid Engineering
Telerad Mfg Corp
United Transformer
Warren Transformer

TRANSFORMERS, Phasing

ACDC Electronics Inc
Basler Electric
Calif Magnetic Control
Communication Accessories
Durakool Inc
ESC Corp
Freed Transformer
Goslin Electric
Industrial Transformer
Interelectronics
Kavamil Co
Microtran Co
N Y Transformer
P and H Electronics
Perkin Engrg Corp
Specialties Inc
Trenton Transformer
United Transformer
Warren Transformer

TRANSFORMER, Power

ACDC Electronics Inc
Airpax Electronics
Ameleo Inc
Amplifier Corp of Amer
Audio Development Co
Basler Electric
Calif Magnetic Control
Campbell Co
Capitron Div AMP
Carol Electronics
Carruthers & Fernandez
Chicago Std Transformer
Communication Accessories
Del Electronics
Dietz Design
DJECO
Durakool Inc
EMP Electronics Res Lab
Electron Arc
Electrosolids Corp
Ferranti Electric
Freed Transformer
GE Apparatus Sales Div
General Railway Signal
Goslin Electric
Green Rectifier
Hevi-Duty Electric
Industrial Rectifier
Industrial Transformer
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For
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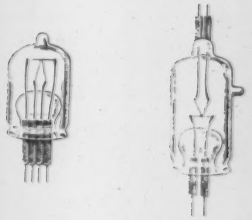

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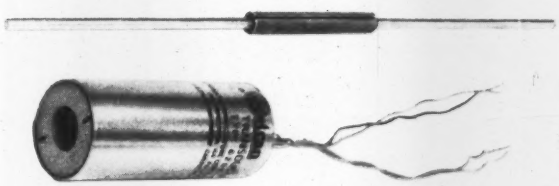

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ATCOTRAN differential transformers translate displacement or position change into linear voltages, providing reliability and infinite resolution where small motions must be accurately measured, recorded or controlled.

ATC's Experimental Kit offers all essential data and components for experimentation and development.

Write for free 32 page "Handbook of Linear Transducers" with theory, characteristics, and applications

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Super-Sub-Miniature transformers

For transistor circuitry
in servo-mechanisms, hearing aids, radios, telephones

- ► **High reliability guaranteed.**
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F-2010	.263	.410	.325
AAT-408	.307	.376	.325
SM-400	.400	.563	.485
NA-2350	.750	1	.750
GEN-2020	1 1/16"	1 1/4"	7/8"

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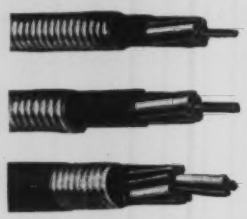

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ARMORTUBE CABLE

• Provides flexible, armored, multiple tube transmission lines for pneumatic and hydraulic metering and control systems.

Saves you $5 to $6 per installed foot over tube-by-tube installations. Provides protection from such hazards as falling objects, welding sparks, and corrosive atmospheres. Uses standard electrical cable accessories.

Available in bundles of one to nineteen 1/4" to 1/2" copper or aluminum tubes. Tubes covered by galvanized steel armor or thermoplastic sheath over and/or under galvanized steel armor.

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Perkin Engrg Corp
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Tech Apparatus Bldrs
Transformers Inc
Trenton Transformer
U S Electronics
United Transformer
Universal Toroid Coil
Varo Mfg Co
Virginia Electronics
Warren Transformer
Westinghouse Electric

TRANSFORMERS, Pulse
ACDC Electronics Inc
Airpax Electronics
Berkshire Laboratories
Calif Magnetic Control
Campbell Co
Capitron Div AMP
Carol Electronics
Chicago Std Transformer
Communication Accessories
Dietz Design
Durakool Inc
EMP Electronics Res Lab
ESC Corp
Esser Electronics
Freed Transformer
GE Apparatus Sales Div
Goslin Electric
Gudeman Co
Hevi-Duty Electric
Industrial Transformer
Kavamil Co
Kelvin Electric
Microtran Co
New England Transformer
N Y Transformer
North Hills Electric
Ortho Filter Corp
PCA Electronics
Pacific Instrument Co
Packard Bell
Pearson Electronics
Perkin Engrg Corp
Polyphase Instr Co
Pulse Engrg Inc
Rixon Electronics
Sangamo Electric Co
Stavid Engineering
Sterling Transformer
Technitrol Engrg
Transformers Inc
United Transformer
Universal Toroid Coil
Valor Instruments
Varo Mfg Co
Warren Transformer
Westinghouse Electric

TRANSFORMERS, Split Core
ACDC Electronics Inc
Annis Co R B
Arnold Engineering
Basler Electric
Calif Magnetic Control
Capitron Div AMP
Carruthers & Fernandes
Communication Accessories
Dietz Design
Durakool Inc
EMP Electronics Res Lab
Freed Transformer
GE Apparatus Sales Div
Goslin Electric
Hevi-Duty Electric
Industrial Transformer
Interelectronics
James Vibrapowr Co
Knopp Inc
Microtran Co
N Y Transformer
Perkin Engrg Corp
Tech Apparatus Bldrs
Transformers Inc
Trenton Transformer
Universal Toroid Coil
Varo Mfg Co
Warren Transformer

TRANSFORMERS, Ultrasonic
Audio Development Co
Basler Electric
Calif Magnetic Control
Dietz Design
Durakool Inc
Electron Arc
Ferranti Electric
Freed Transformer
Gulton Industries
Industrial Transformer
Interelectronics
Sangamo Electric Co
Sterling Transformer
Microtran Co
N Y Transformer
North Hills Electric
Pearson Electronics
Transformers Inc
Trenton Transformer
Warren Transformer

TRANSFORMERS, Variable, including Autotransformers
Airpax Electronics
Allis-Chalmers
Avionic Supply
Basler Electric
Calif Magnetic Control
Canadian Marconi
Chicago Std Transformer
Del Electronics
Dietz Design
Durakool Inc
Eastern Specialty Co
Electron Arc
Electrosolids Corp
Freed Transformer
Gates Electronic
GE Apparatus Sales Div
General Radio
Green Rectifier
Hevi-Duty Electric
Industrial Rectifier
James Vibrapowr Co
Kavamil Co
Land-Air Inc
Microtran Co
Pacific Instrument Co
Schaevitz Engineering
Standard Electrical Prods
Superior Electric Co
Tech Apparatus Bldrs
Trenton Transformer
United Transformer
Universal Toroid Coil
Virginia Electronics
Westinghouse Electric

TRANSFORMERS, Variable, Voltage Testing
Basler Electric
Calif Magnetic Control
Dietz Design
Durakool Inc
Electron ARC
Gates Electronics
GE Apparatus Sales Div
Green Rectifier
Industrial Transformer
Superior Electric Co
Tech Apparatus Bldrs
United Transformer
Universal Toroid Coil

TRANSISTORS,
Advanced Research
Amperex Electronic
Bourns Inc
CBS Electronics
Clevite Transistor Prods
Delco Radio
DJECO
GE Semicond Prods
General Transistor
Hughes Products
Industro Transistor
Lansdale Tube
Motorola C and E
Pacific Semiconductors
Ramo-Wooldridge
Silicon Transistor
Sylvania Semiconductor
Tech Apparatus Bldrs
Texas Instruments
Transitron Electronic
Westinghouse Electric
Westinghouse Semicond.

TUBES, Cathode Ray, including Display, Camera, Storage, etc.
British Industries
CBS Electronics
Canadian Marconi
Corning Glass
Diamond Power Specialty
DuMont Labs Allen B
Electronic Tube
Ferranti Electric
GE Power Tube Dept
General Electrodynamics
Hughes Products
Intercontinental Elx
Lansdale Tube
Stromberg-Carlson Co
Waterman Products

TUBES, Discharge, Gas and Vapor, including Argon, Mercury, Neon, Sodium, etc.
Amglo Corp.
Amperex Electronic
Aristo Grid Lamp
British Industries
Canadian Marconi
Central Electronic Mfgrs
Electrons
Ferranti Electric
GE Power Tube Dept
Gordos Corp
Hughes Products
Kemlite Labs
Microwave Associates
Wiltec Electronics

TUBES, Electrometer
British Industries
Canadian Marconi
Ferranti Electric
GE Power Tube Dept

TUBES, Electron Vacuum
Amperex Electronic
British Industries
Burroughs Elx Tube
CBS Electronics
Canadian Marconi
Central Electronic Mfrs
Eitel-McCullough
Ferranti Electric
GE Power Tube Dept
Lansdale Tube
Lewis & Kaufman Ltd
Hughes Products
Wiltec Electronics

TUBES, Geiger-Mueller (see also Counters, G-M)
Amperex Electronic
Baird-Atomic Inc
British Industries
Canadian Marconi
Isotopes Specialties
Landsverk Electrometer
Nuclear-Chicago
Nuclear Dev Lab
Nucleonic Corp of Amer
Technical Associates
Wood N Counter Lab

TUBES, Glow (see also Tubes, Discharge)
Amglo Corp
Amperex Electronic
Baird-Atomic Inc
British Industries
Burroughs Elx Tube
Bush Associates G F
Canadian Marconi
Chicago Miniature Lamp
Ferranti Electric
Kemlite Labs
Wiltec Electronics

TUBES, Ignitron
Amperex Electronic
GE Power Tube Dept
Natl Electronics
Westinghouse Electric

TUBES, Klystron
Amperex Electronic
Applied Radiation Corp
British Industries
Canadian Marconi
Eitel-McCullough
GE Power Tube Dept
Hughes Products
Varian Associates

TUBES, Magnetron
Amperex Electronic
British Industries
Canadian Marconi
GE Power Tube Dept
Microwave Associates

TUBES, Photosensitive including Pototubes and Photocells
Eastman Kodak
Energy Kontrols
GE Power Tube Dept
General Electrodynamics
Greiner Co Emil
Photobell Co
Western Radiation Lab

TUBES, Thyratron
Amperex Electronic
British Industries
Canadian Marconi
Electrons
GE Power Tube Dept
Hughes Products
Natl Electronics
Wiltec Electronics

TUBES, Traveling Wave (see also Microwave Equipment—Cat. 8)
British Industries
Canadian Marconi
Eitel-McCullough
Electronic Tube
GE Power Tube Dept
Hughes Products
Lewis & Kaufman Ltd
Porter Inc Geo K
Varian Associates

TUBES, X-ray
Aeroquip Corp
Amperex Electronic
British Industries
Ferranti Electric
GE X-Ray Dept
Kemlite Labs
Westinghouse Electric

TUBING, Flexible, Multiple Tube Bundles
Airtron Inc
Bailey Meter Co
Breeze Corporations
Crescent Insulated Wire
Dekoron Prods Div
Illumitronic Engrg
M and Q Plastic Products
Nylon Moldin
Okonite Co
Penna Fluorocarbon
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VARISTORS
GE Magnetic Materials
Precision Thermometer
Trio Laboratories
Union Switch & Signal
U S Semiconductor Prods
Victory Engrg Corp

VIALS, Level
Bache & Co Semon
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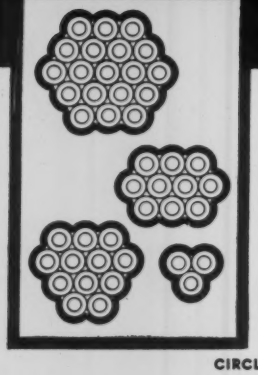
PYRAMID
"INSTRUPACK"
(TUBING BUNDLES)

POLYETHYLENE TUBES ENCLOSED IN VIRGIN PVC (VINYL) SHEATH

STANDARD
Tubing—¼" O.D. x .040" Wall, .045" or .062" Sheath
Tubing—⅜" O.D. x .062" Wall, .045" or .062" Sheath



Tough vinyl outer sheath with excellent chemical atmospheric resistance. Inside tubes are Polyethylene available in standard colors with pair of telephone wire leads. Lengths to requirements.

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PLASTIC COATED METAL TUBING—standards and specials to order.

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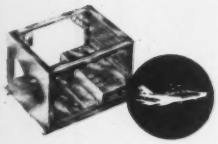
CIRCLE 346 ON READER-SERVICE CARD

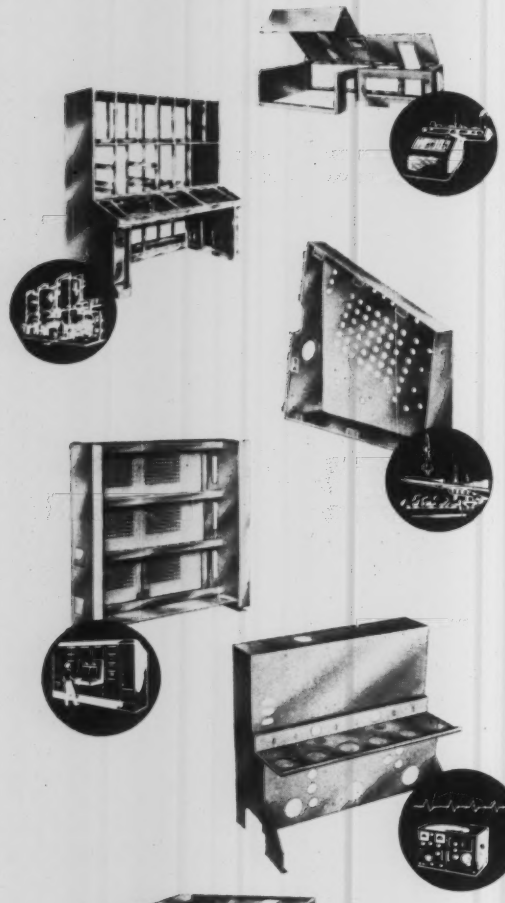
Machines / Materials

1960 BUYERS' GUIDE 9

MACHINES, TOOLS, ACCESSORIES AND MATERIALS FOR INSTRUMENT MANUFACTURE/ MAINTENANCE

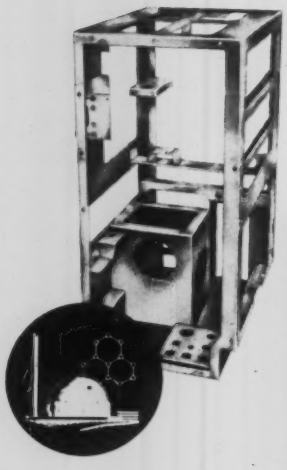


FALSTROM ENCLOSURES FOR EVERY ELECTRONIC INDUSTRY

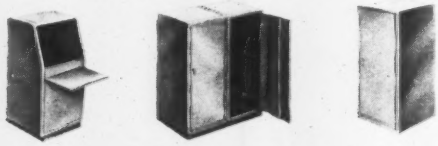


Falstrom's experience in working metals can help you create the enclosures you need for your instruments, controls, equipment or machinery. Whether you require a complete control room with color-coded graphic panelboards, or a simple chassis, Falstrom facilities and skilled personnel can help you achieve better design and more economical production.

Falstrom metal fabrications — consoles, racks, chassis, weldments, panelboards, enclosures, — are in service throughout American industry. They are produced to customer specifications in steel, aluminum, magnesium, stainless and other metals.



The STANDARDized Line



Falstrom now also offers a line of standardized units that cost less because they are fabricated from stock tools and dies. These units are not shipped from stock but are adapted to the special requirements of the equipment housed. Write today for FREE booklet "How To Get Your Quotation on a Falstrom Standardized Enclosure".

Submit prints for quotation or ask for literature.

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Passaic, N. J.
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We also make hard and soft copper water tube . . . copper air conditioning and refrigeration tubes . . . copper tubing for propane gas lines, heat exchangers, automotive and industrial applications.

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Kensico Tube

COMPANY INCORPORATED, MT. KISCO, N. Y.

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CONSOLE CABINETS

the ultimate in

MODULAR CONSOLE SYSTEMS

* NOW AVAILABLE TO SUIT YOUR INDIVIDUAL REQUIREMENTS
* STANDARD, FLEXIBLE UNITS WITH CUSTOM FEATURES DESIGNED FOR FUNCTION AND BEAUTY
* DESIGNED FOR UNLIMITED VARIETY OF ARRANGEMENTS
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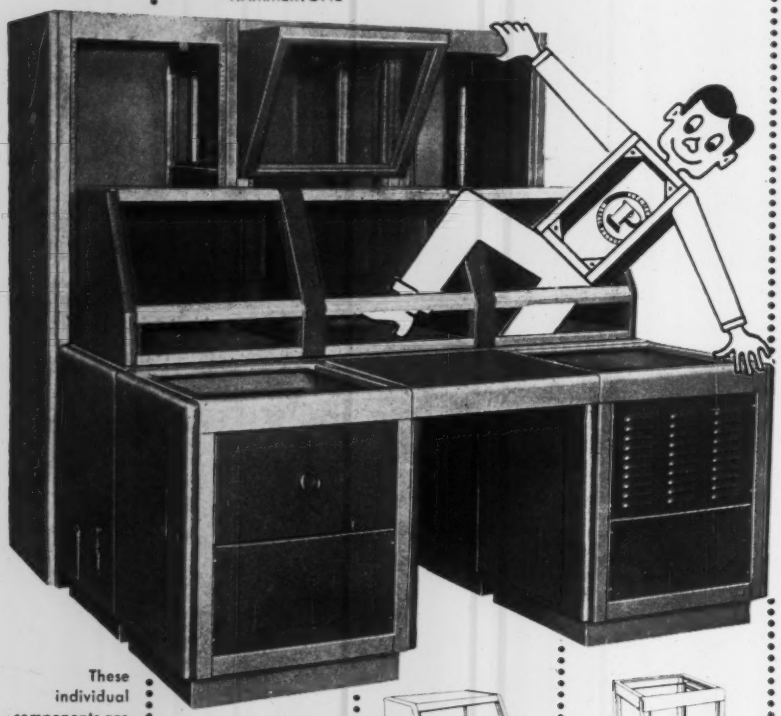

These individual components are designed to be assembled into an unlimited variety of functional and beautiful arrangements.

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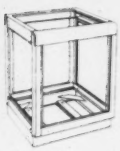

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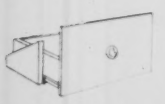
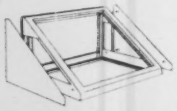


SLIDING DRAWER



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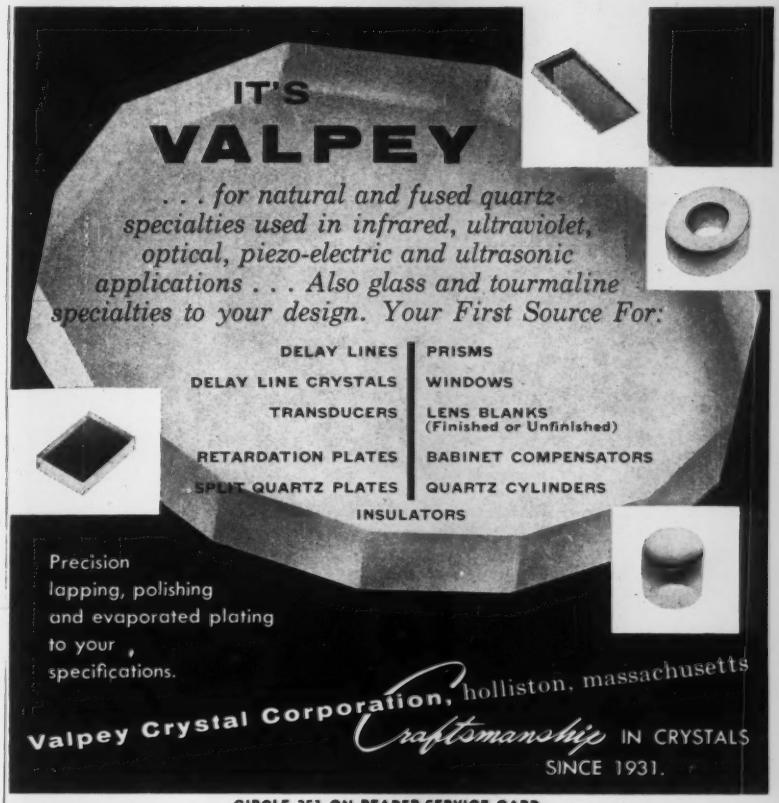
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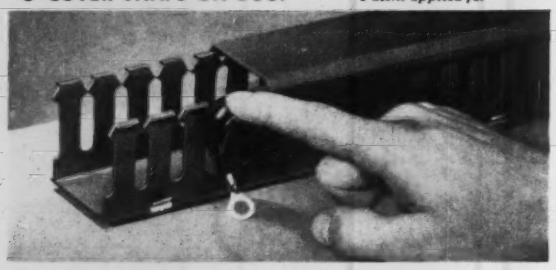

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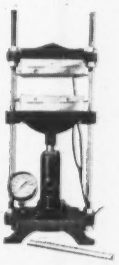
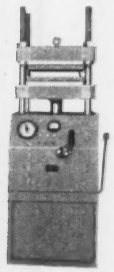


3-TON PRESS. MODEL 3-8.



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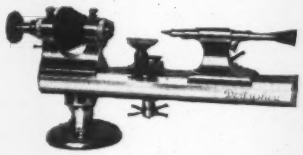

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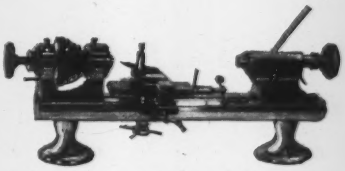
Center Height—5 CM, Collet Capacity—.1969"



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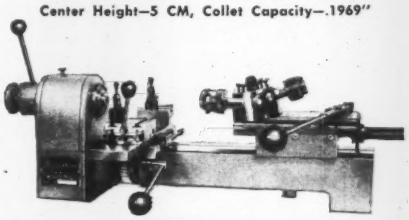
Center Height—2.35" (6 CM)
Chuck Capacity—.004" to .315"



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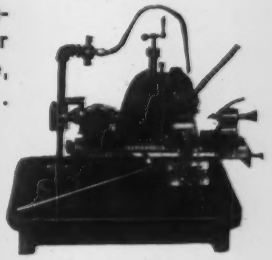

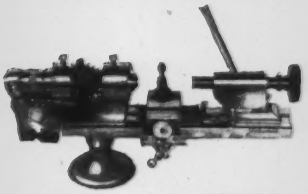

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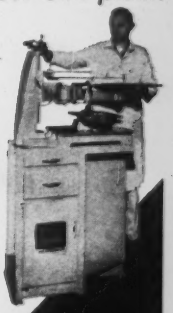

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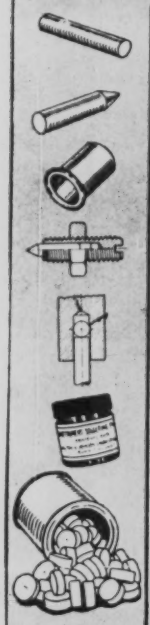

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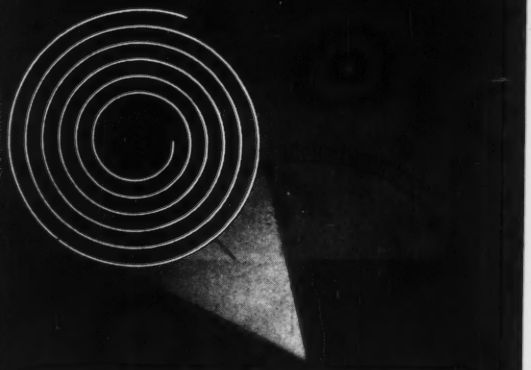

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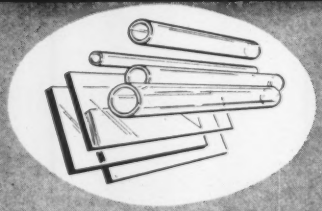

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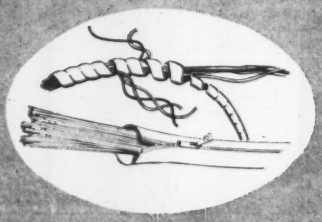

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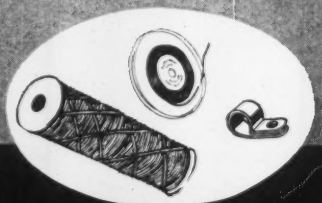

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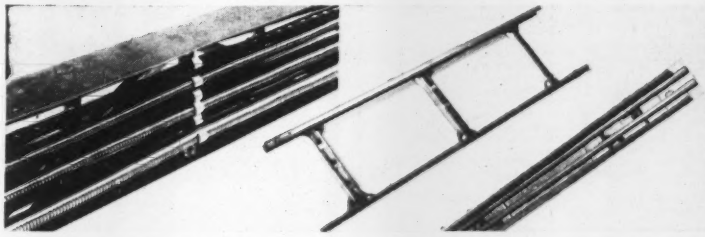

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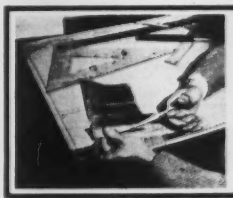

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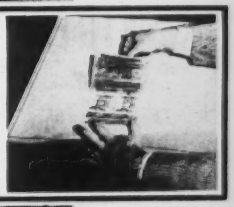

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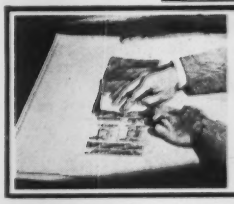

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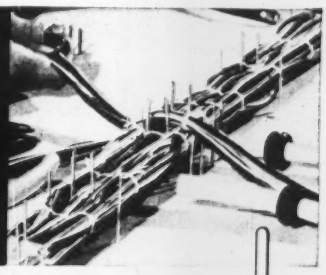

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Metals & Controls Div
Uniform Tubes

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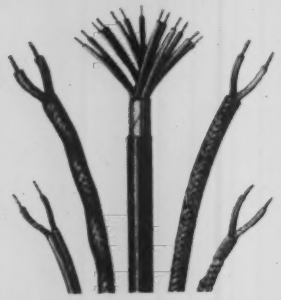

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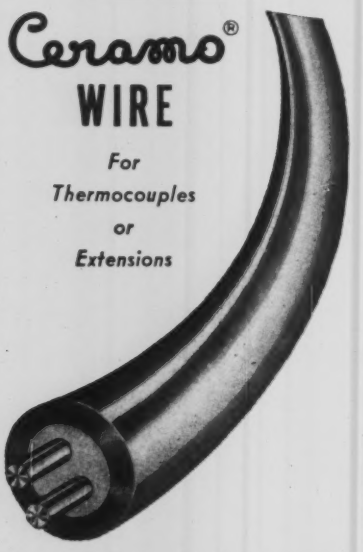

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Bishop & Co
Electronic Parts
Engelhard Industries
Gatti Inc Aurele M
Metals & Controls Div
Victor Equipment

TWEEZERS, Instrument (see also Tools, Precision)
Bishop & Co J
Dixon Inc William
Dyneers
Engelhard Industries
Handicraft Tools

WASHERS, Metal & Plastic
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Federal Screw Products

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Dixon Inc William
Hamilton Watch Co
Kendrick & Davis
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Morris Co J I

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Ewald Instruments
Smith Welding Equip

WICKS FOR WET BULBS
Hill & Co E Vernon

WIRE, Copper, Enameled
Acme Wire Co
Alpha Wire Corp
Electric Auto-Lite
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Hitemp Wires Inc
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Wire, Covered
Alpha Wire Corp
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Chester Cable
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Gordon Co Claud S
Haveg Industries
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Rockland Insul Wire
Rome Cable Corp
Sequoia Wire
Tensolite Insul Wire
Thermax Wire
Western Insul Wire

WIRE, Fuse
Engelhard Industries
Haveg Industries

WIRE, Insulated, all insulations except enameled and refractory
Acme Wire Co
Alpha Wire Corp
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Amer Super Temp Wires
Brand & Co Wm
Chester Cable
Driver Co Wilbur B
Gordon Co Claud S
Haveg Industries
Hitemp Wires Inc
Lewis Engrg Co
Phalo Plastics Corp
Revere Corp of Amer
Rockbestos Products
Rockland Insul Wire
Rome Cable Corp
Sequoia Wire
Tensolite Insul Wire
Thermax Wire
Times Wire & Cable
Western Insul Wire

WIRE, Magnet
Acme Wire Co
Alpha Wire Corp
Aluminum Co of Amer
Amer Super Temp Wires
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Electric Auto-Lite
Haveg Industries
Hitemp Wires Inc
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Chester Cable
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Lewis Engrg Co
Phalo Plastics Corp
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Thermax Wire
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Driver Co Wilbur B
Electronic Parts
Elgin Natl Watch
Illumitronic Engrg
Paul F H & Stein Bros
Sequoia Wire
Smith Mfg Co Inc
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WIRE, Nickel, Monel, and Nickel Chromium
Bishop & Co
Crucible Steel
Driver Co Wilbur B
Electronic Parts
Rodale Mfg Co
Sequoia Wire

WIRE, Refractory Insulated
Aero Research Instr
Amer Super Temp Wires
Revere Corp of Amer
Smith Mfg Co Inc

WIRE, Resistance (Platinum or Platinum-Iridium)
Bishop & Co J
Handy & Harman
Metals & Controls Div

WIRE, Resistance, except Platinum and Platinum-Iridium
Carpenter Steel
Driver Co Wilbur B
Gow-Mac Instrument

WIRE, Spring
Bristol Brass
Crucible Steel
Driver Co Wilbur B
Elgin Natl Watch
Hamilton Watch Co
Stretch Wire Corp

WIRE, Thermocouple, Base Metal
Aero Research Instr
Bishop & Co J
Gordon Co Claud S
InstruLab Inc
Leeds & Northrup
Lewis Engrg Co
Metals & Controls Div
Precision Tube Co
Pyrometer Instr Co
Richards Co Arklay S
Smith Mfg Co Inc
Thermo Electric
Thermo Products Co
Times Wire & Cable
West Instrument

WIRE, Thermocouple, Rare Metal
Aero Research Instr
Bishop & Co J
Gordon Co Claud S
InstruLab Inc
Leeds & Northrup
Metals & Controls Div
Richards Co Arklay S
Smith Mfg Co Inc
Thermo Electric
Thermo Products Co
West Instrument

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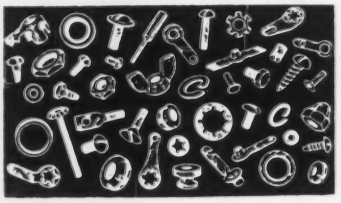

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A

ACDC Electronics, Inc., 2979 N. Ontario St., Burbank, Calif. VI-9-2414

A'G'A Division, Elastic Stop Nut Corp. of America, 1027 Newark Ave., Elizabeth 3, N. J. ELizabeth 2-2900

AMP Inc., Eisenhower Blvd., Harrisburg, Pa. JO-4-0101

Abrams Instrument Corp., 606 E. Shiawassee St., Lansing 1, Mich. IV-4-9441

Accuracy Scientific Instrument Co., 335 E. Chew Ave., Philadelphia 20, Pa. DA 4-5689

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13537 Addison St., Sherman Oaks, Calif.
STate 9-8103

Illinois
Rene Blozat Co.
6322 N. Milwaukee Ave.
CHICAGO 46, Illinois

Massachusetts
Monahan & Co.
P.O. Box 474, NORWOOD, Mass.
NOrwood 7-5961

Middle Atlantic
East Coast Liaison, Inc.
P.O. Box 243
LUTHERVILLE, Maryland

Missouri
Kinrick Co.
222 Olympia Drive
ST. LOUIS, 21, Missouri

Ohio
Callaghan-Bach
2209 Losantiville Road
CINCINNATI 13, Ohio

Upstate New York
Savco, Inc.
124 Kinne Road
EAST SYRACUSE, N. Y.

Accurate Specialties Co, Inc., 37-11 57th St., Woodside 77, N. Y. TW-9-5757

Ace Electronics Assocs., Inc., 99 Dover St., Somerville, Mass. SO-6-5130

Ace Plastic Co., 91-30 Van Wyck Expwy., Jamaica 35, N. Y. JAmaica 3-5500

Ackerman Engravers Inc., 458 Broadway, New York 13, N. Y. BArclay 7-1479

Ackerman-Gould Co., 10 Neil Ct., P.O. Box 188, Ocean Side, L. I., N. Y. ORiole 8-4110
(See advertisement on page 168)

Acme Gauge & Instrument Co., Inc., 30 Main St., Brooklyn 1, N. Y. TR-5-9536

Acme Industrial Co., 200-222 N. Laflin St., Chicago 7, Ill. MO 6-4122

Acme Scientific Co., 1450 W. Randolph St., Chicago 7, Ill. MOnroe 6-1834

Acme Wire Co., 1255 Dixwell Ave., New Haven 14, Conn. LOcust 2-2171

Acro Div., Robertshaw-Fulton Controls Co., 2040 E. Main St., Columbus 16, Ohio. CLearbrook 3-8531

Acoustica Associates, Inc., Fairchild Court, Plainview, New York OVerbrook 1-2100
Dallas Representative
Allied Components Inc.
2517 Converse St., Dallas 7, Texas
RIverside 2-2830

Acromag, Inc., 22519 Telegraph Rd., Detroit 41, Mich. EL-6-7211

Acromark Co., 11 Morrell St., Elizabeth 4, N. J. ELizabeth 2-6500

Acton Laboratories, Inc., 533 Main St., Acton, Mass. COlonial 3-7756
(See advertisement on page 118)

New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Actuator Products Corp., 12 Nashua St., Woburn, Mass. WElls 3-1400

Adage, Inc., 292 Main St. Cambridge 42, Mass. UNiversity 4-7410

Adams Co., R. P., 365 East Park Drive, Buffalo 17, N. Y. VIctoria 2608

Advance Relays Electronics Div., Elgin National Watch Co., 2435 N. Naomi St., Burbank, Calif. VIctoria 9-1446

Advanced Products Co., 59 Broadway, North Haven, Conn. CEdar 9-1664

Advanced Research Associates, Inc., 4130 Howard Ave., Kensington, Md., WHitehall 2-4800

Aero Electronics Corp., 1745 W. 134th St., Gardena, Calif. FAculty 1-2196

Aero Research Instrument Co., Inc. 315 N. Aberdeen St., Chicago 7, Ill. TAylor 9-6400
(See advertisement on page 197)

Aero Research Instrument Co., Inc. Dept. HBG, 315 N. Aberdeen St., Chicago 7, Ill. Phone—TA-9-6400

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Pittsburgh Area Representative
W. A. Stoeltzing, Inc.
940 Western Ave., Pittsburgh 33, Pa.
ALlegheny 1-9400

Aeroquip Corp., 300 S. East Ave., Jackson, Mich. ST 2-6361

Aerotest Laboratories, Inc., 129-11 18th Ave., College Point 56, N. Y. INdependence 1-7272

Aerovox Corp., 740 Belleville Ave., New Bedford, Mass. Wyman 4-9661

Aldlin Automation, Inc., 1613 E. New York Ave., Brooklyn 12, N. Y. EVergreen 5-4246

Ainsworth & Sons, Wm., Inc., 2151 Lawrence St., Denver 2, Colo. ALpine 5-1723

Air Conditioning Equipment Corp., 219 E. 44th St., New York 17, N. Y. MU-7-3099

Airborne Accessories Corp., 1414 Chestnut Ave., Hillside 5, N. J. MU 8-0250

Aircraft Armaments, Inc., Cockeysville, Md. VAlley 5-8400

Air-Maze Corp., 25000 Miles Rd., Cleveland 28, Ohio MOntrose 2-8000

Air O-Tronics Engineering Co., P.O. Box 31, Lancaster, Calif. WHitehall 3-4654

Airpax Electronics Inc., Seminole Division, Fort Lauderdale, Fla. LUdlow 3-6160

Air-Shields, Inc., Hatboro, Penna. OSborne 5-5200

Airtron Inc., 200 Hanover Ave., Morris Plains N. J. JEfferson 9-5500

Airtronics Inc., 5522 Dorsey Lane, Washington 16, D. C. OLiver 4-1676

Alconox, Inc., 853 Broadway, New York 3, N. Y. GRamercy 3-1300

Alden Products Co., 126-D N. Main St., Brockton, Mass. JUniper 3-0160
(See advertisement on page 182)

Alfa-American Corp., 303 W. 42nd St., New York 36, N. Y.

Alford Manufacturing Co., 299 Atlantic Ave., Boston 10, Mass. HAncock 6-2150

Alfred Electronics, 897 Commercial St., Palo Alto, Calif.

Alina Corp., 122 E. 2nd St., Mineola, L. I., N. Y. PI 7-5336

All American Tool & Mfg. Co., 8027 Lawndale Ave., Skokie, Ill. ORchard 3-7084

Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa. COurt 1-5300

Allegany Instrument Co., Inc., 1091 Wills Mt., Cumberland, Md.
So. Calif.-Ariz.-N. Mex Representative
DyraSales Company
4643 E. Olympic Blvd., Los Angeles 22, Calif.
ANgelus 8-3814

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Georgia-Florida-South Carolina Representative
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Miami, Florida

Eastern Pennsylvania-New Jersey Representative
R. E. Weber Company
15 Terry Lane, East Brunswick, N. J.
CLifford 7-5243

Texas-Oklahoma Representative
Don Champion Company
P.O. Box 456
Hurst, Texas

Allen Business Machines, R. C., Inc., 678 Front Ave., N. W. Grand Rapids 4, Mich. GL-6-8541, Ext. 312

Allenair Corp., 255 East 2nd St., Mineola, L. I., N. Y. PL-7-5450
(See advertisement on page 162)

Allen-Bradley Co., 136 W. Greenfield Ave., Milwaukee 4, Wis. OR-1-2000

Allied Control Co. Inc., 2 East End Ave., New York 21, N. Y. BUtterfield 8-7403

Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill. HAymarket 1-6800

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. SPring 4-3600. Valve Div., York, Pa.
California Representative (Valve Div.)
Luscombe Engineering Co.
1129 So. Fair Oaks Ave., Pasadena, Calif.
MU 2-3386
130 N. "B" St., San Mateo, Calif. DI 2-7057

All-Tronics, Inc., 45 Bond St., Westbury, L.I., N. Y. ED-3-3090

Almo Mfg. Co., 113-119 Sussex Ave., Newark 3, N. J. HU-2-2185

Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn. FIreside 8-3724

Alpha Wire Corp., 200 Varick St., New York 14, N. Y. ALgonquin 5-5400

Alpitec, Inc., 49 Gleason Ave., Stamford, Conn. FIreside 8-7788

Altair, Inc., Hillside Ave., Terryville, Conn. LUdlow 3-1343

Altenedor & Sons, Theo., 1217 Spring Garden St., Philadelphia 23, Pa. POplar 5-3180
(See advertisement on page 141)

Alto Scientific Co., 855 Commercial St., Palo Alto, Calif. DAvenport 1-3434

Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa. ATlantic 1-4545

Amatom Electronic Hardware Co., Inc., 88 Drake Ave. New Rochelle, N. Y. BEverly 5-4441

Amco Engineering Co., 7333 W. Ainslie St., Chicago 31, Ill. UNderhill 7-8500
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Amelco, Inc., 2040 Colorado Ave., Santa Monica, Calif. EX 3-7281

Amerac, Inc., Dunham Road, Beverly, Mass. WAlker 2-8611

Amerelay Corp., 130 County Courthouse Rd., New Hyde Park, N. Y. PIoneer 7-2150

American Balance Corp., 48 Potter Ave., New Rochelle, N. Y. NE 6-8080

American Cystoscope Makers, Inc., 8 Pelham Parkway, Pelham Manor (Pelham), N. Y. PElham 8-4800

American Data Div., American Electronics, Inc., 75 Front St., Brooklyn, N. Y. ULster 8-0500

American Electronic Laboratories, Inc., 121 N. 7th St., Philadelphia 6, Pa., WA 5-8780

American Electronics, Inc., 1025 W. 7th St., Los Angeles 17, Calif.

American Felt Co., Glenville, Conn., JEfferson 1-8700
American Gas Furnace Co., 140 Spring St., Elizabeth, N. J. EL-2-2120

American Kloeckner-Moeller Corp., 4113 E. 11th St. Tulsa 12, Okla. WEbster 6-3048

American Laubscher Corp., 250 W. 57th St., New York 19, N. Y. JUdson 6-7474
(See advertisement on page 167)

American Measurement & Control, 240 Calvary, Waltham 54, Mass. TWinbrook 4-6212

American Meter Co., 13500 Philmont Ave., Philadelphia 16, Pa. ORchard 3-2100

Albany Representative
96 South Swan Street
Albany, N. Y.
Albany 4-9760

Atlanta Representative
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Atlanta 5, Ga.
Cedar 3-4527

Birmingham Representative
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Birmingham 3, Ala.
Alpine 1-8361

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San Francisco 11, Calif.
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Tulsa Representative
709 Kennedy Building
Tulsa 1, Oklahoma
Luther 3-5163

American Optical Co., Instrument Div., Box "A", Buffalo 15, N. Y. FI. 4000

American Paulin System, 1524 So. Flower St., Los Angeles 15 Calif. RI 90013

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American Smelting and Refining Co., 120 Broadway, New York 5, N. Y. REctor 2-9500

American Super Temperature Wires, Inc., 36 W. Canal St., Winooski, Vt. UNiversity 2-9636

American Thermo Electric Co., 1023 N. Fuller Ave., Los Angeles 46, Calif. HOllywood 4-1632
(See advertisement on page 183)

American Thermo-Ware Co., 12-16 Warren St., New York 7, N. Y.

American Time Products, 580-5th Ave., New York 36, N. Y. PLaza 7-1430

Amglo Corp., 4333 N. Ravenswood Ave., Chicago 13, Ill. BUckingham 1-2727
(See advertisement on pages 61, 168, 171)

Ampco Mfg. Co., 246 E. 2nd St., Plainfield N. J. PLainfield 7-4600

Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L. I., N. Y. Wells 1-6200

Amperite Co., Inc., 561 Broadway, New York 12, N. Y.
(See advertisement on page 173)

Ampex Corp. Instrumentation Div., 934 Charter St., Redwood City, Calif. EMerson 9-1481

Amphenol Connector Div., Amphenol-Borg Electronics Corp., 1830 S. 54th Ave., Chicago 50, Ill.
Authorized Distributor
Schweber Electronics
60 Herricks Rd., Mineola, L. I., N. Y.
PIoneer 6-6520

Amplifier Corp. of America, 398 Broadway, New York 13, N. Y. WOrth 6-2929

Amther Testing Instrument Co. Inc., 45-53 Van Sinderen Ave., Brooklyn 7, N. Y. Dickens 6-8841
(See advertisment on page 139)

Anadex Instruments, Inc., 14734 Arminta St., Van Nuys, Calif. STate 0-7911

Analogue Controls, Inc., 200 Frank Road, Hicksville, N. Y. OVerbrook 1-7300

Analytic Systems Co., 980 Fair Oaks Ave., Pasadena Calif. RYan 1-6634

Analytical Measurements, Inc., 585 Main St., Chatham, N. J. MErcury 5-7474

Andersen Laboratories, Inc., 501 New Park Avenue, West Hartford, Conn. AD-3-4491

Andromeda, Inc., 3742 Howard Ave., Kensington, Md. LOckwood 5-3775

Annin Company, 1040 So. Vail Ave., Montebello, Calif. RAymond 3-9351

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(See advertisement on page 198)

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Applied Instruments, Inc., 25 Will Place, Brooklyn 7, N. Y. CLoverdale 7-0885

Applied Physics Corp., 2724 So. Peck Road, Monrovia, Calif. HIllcrest 6-7181

Applied Radiation Corp., 2404 No. Main St., Walnut Creek, Calif. YEllowstone 5-2250

Applied Research Laboratories, Inc., P.O. Box 1710, Glendale, Calif. CHapman 5-5524

Applied Science Corp. of Princeton, Princeton, N. J. SW-9-1000

Arenberg Ultrasonic Laboratory, Inc., 94 Green St., Jamaica Plain 30, Mass. JAmaica 2-8640

Arens Controls, Inc., 2017 Greenleaf St., Evanston, Ill. DA 8-4700
(See advertisement on page 158)

Aristo Grid Lamp Products, Inc., 65 Harbor Road, Port Washington, L. I., N. Y. PO-7-6577
(See advertisement on page 122)

Arkwin Industries Inc., 648 Main St., Westbury, L. I., N. Y. EDgewood 3-2640

Arma Division, American Bosch Arma, Roosevelt Field, Garden City, N. Y. PIoneer 2-2000

Arnold Engineering Co., P. O. Box G, Marengo, Ill. Chicago ANdover 3-6300

Arnoux Corp., 11924 W. Washington Blvd., Los Angeles 66, Calif. TExas 0-5371

Artisan Metal Works Co., 11400 Madison Ave., Cleveland 2, Ohio. LAkewood 1-6173

Assembly Products, Inc., 75 Wilson Mills Road, Chesterland, Ohio. HAmilton 3-4436 (Cleveland)

Associated Control Equip., Inc., P.O. Box 136, Coraopolis, Pa. AMherst 4-8161

Associated Research, Inc., 3789 W. Belmont Ave., Chicago 18, Ill. COrnelia 7-4040
(See advertisement on page 104)

Associated Specialties Co., 1751 Main St., Orefield, Pa. EX-5-1275
(See advertisement on page 110)

Associated Spring Corp., Bristol, Conn. LUdlow 3-1331

Associated Testing Laboratories, Inc., 117 Clinton Rd., Caldwell, N. J. CApital 6-7407

Associated Valve Co., W. Walnut St., North Wales, Pa. OXbow 9-4485

Astra Technical Instrument Corp., 1132 Mission St., So. Pasadena, Calif. Ryan 1-2114

Atkins Technical Inc., 1276 W. 3rd St., Cleveland 13, Ohio SUperior 1-1333
(See advertisement on page 66)

Atlantic Research Corp., Shirley Highway at Edsall Rd., Alexandria, Va. FLeetwood 4-3400

Atlas Electric Devices Co., 4114 N. Ravenswood Ave., Chicago 13, Ill.

Atlas Engineering Co., Inc., 176 Blue Hill Ave., Roxbury, Mass. HI-5-7100

Atlas Valve Co., 280 South St., Newark 5, N. J.

Atocon Corp., 527 N. Union St., Galion, Ohio

Atronic Products, Inc., 1 Bala Ave., Bala-Cynwyd, Pa. GReenwood 7-1860

Auburn Mfg. Co., 50 Stack St., Middletown, Conn. DIamond 6-6631

Audio Development Co., 2833-13th Ave. So., Minneapolis 7, Minn. PArkway 9-7386

Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y. PLaza 1-6640

Audio Instrument Co., Inc., 135 W. 14th St., New York 11, N. Y. ORegon 5-7820

Autoclave Engineers Sales Corp., 2930 W. 22nd St., Erie, Pa. TE 8-2071

Auto-Control Laboratories, Inc., 333 S. Hindry Ave., Inglewood 1, Calif. OR-8-4934

Automark Marking Equipment Co., 1920 So. Vandeventer Ave., St. Louis 10, Mo. PRospect 3-0567

Automatic Electric Sales Co., Northlake, Illinois. FIlmore 5-7111

Automatic Metal Products Corp., 323 Berry St., Brooklyn 11, N. Y. EV-8-6057

Automatic Scale Co., Inc., 180 Lafayette St., New York 13, N. Y. CAnal 6-7676

Automatic Switch Co., 50-56 Hanover Rd., Florham Park, N. J. FRontier 7-4600
(See advertisement on page 73)

Automatic Timing & Controls Inc., 201 Old Gulph Road, King of Prussia, Penna. BRoadway 9-1100
(See advertisement on pages 31, 69, 112, 183)

Automatic Valve Co., 37415 Grand River, Farmington, Mich. GR-4-6700

Automation Controls Corp., 5737 W. 98th St., Los Angeles 45, Calif. SPring 6-0420

Automation Products, Inc., 3030 Maxroy, Houston 24, Tex. UN-9-1485

Autonetics, Div. of No. American Aviation, Inc., 9150 E. Imperial Hwy., Downey, Calif. SPruce 3-2233

Autotron, Inc., 3629 N. Vermilion St., Danville, Ill. HIckory 6-0650
Representative
John T. Fuhrman, Jr.
6822 Thomas Blvd., Pittsburgh 8, Pa.
MOntrose 1-3838

Autotronics, Inc., P.O. Box 208, Florissant, Mo. TEmple 7-3565

Avco Corp., Research & Advanced Dev., 201 Lowell St., Wilmington, Mass. OLiver 8-8911. X2709

Avionic Supply, 5790 Washington Blvd., Culver City, Calif. WEbster 3-8523

Axler Associates, Inc., 102-42-43rd Ave., Corona 68, N. Y. HAvemeyer 9-7719
(See advertisement on page 123)

B

B. & B. Electric Motor Co., 206 Lafayette St., New York 12, N. Y. WO-6-5777

B & F Instruments, Inc., 3644 N. Lawrence St., Philadelphia 40, Pa. GArfield 5-4175
Rep—E. Pa., S.N.J., Dela., Md., D. C., Va.
Polymetric Devices Co., Inc.
P.O. Box 236, Glenside, Pa. TU-7-4873
P.O. Box 246, Silver Spring, Md.

B & H Instrument Co., Inc., 3479 West Vickey Blvd., Fort Worth, Texas
(See advertisement on page 113)

B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I. GAspee 1-4302

BJ Electronics, Borg-Warner, 3300 Newport Blvd., Santa Ana, Calif. KI-55581

B/W Controller Corp., 220 E. Maple, Birmingham, Mich. MI 4-5940

Bacharach Industrial Instrument Co., 200 N. Braddock Ave., Pittsburgh 8, Pa. CHurchill 2-5400
(See advertisement on page 67)

Bache & Co., Semen, 636 Greenwich St., New York 14, N. Y. WAtkins 1-2121
(See advertisement on page 189)

Bacon Industries, Inc., 192 Pleasant St., Watertown 72, Mass. WAtertown 4-5000

Badger Meter Mfg. Co., 4545 W. Brown Deer Road, Milwaukee 18, Wis. FLagstone 5-0400

Bailey Co., Chas. M., 667 Folsom St., San Francisco 7, Calif. EXbrook 7-1611

Bailey Meter Co., 1041 Ivanhoe Rd., Cleveland 10, Ohio. GL-1-4600
(See advertisement on pages 30, 31, 36, 38, 40, 46, 50, 57, 58, 67, 74, 79, 162, 171, 173, 174, 184

Baird-Atomic, Inc., 33 University Rd., Cambridge 38, Mass. UNiversity 4-7420
(See advertisement on pages 32, 86)

New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Baker Company, Inc., 106 Granite St., Biddeford, Me. Telephone 4-8441

Balco Research Laboratories, Capacitor Div., 49-53 Edison Pl., Newark 2, N. J. MI-3-5200

Bald Eagle Corp., 356 Cedar St., St. Paul 1, Minn. CA-2-7257

Baldwin-Lima-Hamilton Corp., Electronics & Instrumentation Div., 42-4th Ave., Waltham 54, Mass. TWinbrook 4-6700

Barber Colman Co., 1700 Rock St., Rockford, Ill. WO-86833 Electrical Components Div., Small Motors Div., 1300 Rock St., Rockford, Ill.

Barden Corp., Danbury, Conn. PIoneer 3-3885

Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif. LUdlow 9-6181

Barnes Engineering Co., 30 Commerce Rd., Stamford, Conn. FIreside 8-5381

Barnstead Still & Demineralizer Co., 244 Lanesville Terrace, Boston 31, Mass. JA-4-3100

Barton Instrument Corp., 580 Monterey Pass Rd., Monterey Park, Calif. CUmberland 36501
(See advertisement on page 199)

Basler Electric Co., Route 143, P.O. Box 269, Highland, Ill. Telephone 2123

Baso Inc., 730 N. Jackson St., Milwaukee 1, Wis. Broadway 3-5388

Bausch & Lomb Optical Co., 738 St. Paul St., Rochester 2, N. Y. LOcust 2-3000

Bayley Instrument Co., Box 538, Danville, Calif. VE-7-4649
(See advertisement on page 199)

Temperature Controllers
± .01° C & ± .001° C
Ranges: — 200° C to + 500° C
Write for literature
BAYLEY INSTRUMENT CO.
Box 538 Danville, Calif.

CIRCLE 377 ON READER-SERVICE CARD

Bear Manufacturing Co., Industrial Div., 2016-5th Ave., Rock Island, Ill. Telephone 6-6461

Beaver Gear Works, Inc., 1025 Parmele St., Rockford, Ill. WOodland 3-9691

Becker Brothers Carbon Co., 3450 So. Laramie Ave., Cicero 50, Ill. BIshop 2-1260

Beckman Instruments Inc., Berkeley Div., 2200 Wright Ave., Richmond Calif. LA-6-7730

Beckman Instruments, Inc., Helipot Div., 2500 Fullerton Rd., Fullerton, Calif. TRojan 1-4848

Beckman Instruments, Inc., Scientific & Process Instrs. Div., 2500 Fullerton Rd., Fullerton Calif. OWen 7-1771

Beckman Instruments, Inc., Spinco Div., 1117 California Ave., Palo Alto Calif. DAvenport 6-1970

Beede Electrical Instrument Co., Inc., So. Main St., Penacook, New Hampshire. PLaza 3-6362

Behlman Engineering Co., 2911 Winona Ave., Burbank, Calif. Victoria 9-5733
(See advertisement on page 110)

Bel-Art Products, Pequannock, N. J., OXbow 4-0500

Belfab Corp., 382 Walnut St., Agawam, Mass. RE-7-1277
Representative
Mitchell B. Haisten
The M. B. Haisten Company
P.O. Box 848, Burbank, Calif.

Bellmore Gear Div. (see Empire State Laboratories)

Bellofram Corp., Blanchard Rd., Burlington Mass. Browning 2-2100

Bemco Inc., 11681 Vanowen St., No. Hollywood Calif.

Bendix Computer Div., Bendix Aviation Corp., 5630 Arbor Vitae St., Los Angeles 45, Calif. SPring 6-2220

Bendix Aviation Corp., Cincinnati Div., 3130 Wasson Road, Cincinnati 8, Ohio. ELmhurst 1-2323

Bendix Aviation Corp., Montrose Div., So. Montrose, Pa. Montrose 570

Bendix Aviation Corp., Pioneer Central Div., Hickory Grove Rd., Davenport, Iowa Telephone 7-9101

Bendix Aviation Corp., Scintilla Div., Sidney, N. Y. LOwell 3-9511

BARTON INSTRUMENT CORPORATION SALES REPRESENTATION

NORTH AMERICA

United States of America

Amarillo, Texas	SNYDER COMPANY, INC., 3615 S. Lipscomb St.	FL 6-5471
Anna Maria, Florida	GULF INSTRUMENT ASSOCIATES, P. O. Box 402	9-6821
Atlanta 13, Georgia	HAYDEN ENGINEERING SALES CO., 222 14th St., N.W.	TR 4-4291
Baltimore 18, Maryland	GEORGE GOODMAN COMPANY, 103 E. 25th St.	BE 5-5570
Birmingham 9, Alabama	HAYDEN ENGINEERING SALES CO., 210 Hollywood Blvd.	TR 1-0637
Boston 16, Massachusetts	*CARR BROTHERS COMPANY, 258 Park Square Building	LI 2-1326
Buffalo, New York	M. S. JACOBS & ASSOCIATES, 1807 Elmwood Ave.	DE 3229
Charleston 30, W. Virginia	PROCESS INSTRUMENTS & EQUIPMENT CO., 1904 Washington Ave.	DI 2-2151
Charlotte, N. Carolina	MACGUIRE INSTRUMENT CO., 3214 Highview Road	EM 6-3454
Chicago 46, Illinois	NIELSEN & FRYER, INC., 5717 N. Elston Ave.	NE 1-1824
Cincinnati 8, Ohio	THE ABBOTT COMPANY, 3437 Michigan Ave.	EA 1-2349
Cleveland 7, Ohio	T. I. EQUIPMENT CO., 15017 Detroit Ave.	AC 6-1970
Columbus 1, Ohio	THE ABBOTT COMPANY, 1324 Highland St.	AX 9-4244
Corpus Christi, Texas	SNYDER COMPANY, INC., 1409 Ocean Drive	TU 4-8581
Dallas, Texas	SNYDER COMPANY, INC., 6234 Peeler Ave.	FL 2-0760
Dayton, Ohio	THE ABBOTT COMPANY, 407 Realty Building	BA 8-7203
Denver 11, Colorado	*PROCESS EQUIPMENT CO., 2548 W. 29th Ave.	GL 5-4766
Detroit, Michigan	INDUSTRIAL INSTRUMENT SUPPLY & MFG. CO., 14222 Robson Ave.	VE 8-5940
Englewood, New Jersey	BLAKE EQUIPMENT CORP., 409 Grand Avenue	LO 7-4252
Farmington, New Mexico	SNYDER COMPANY, INC., 1903 E. Mojave St.	DA 5-6972
Glens Falls, New York	O. R. LAWRENCE CO., Room 411, 21 Bay Street	2-4528
Hartford, Connecticut	CARR BROTHERS COMPANY, 119 Ann Street	CH 7-0395
Houston 24, Texas	*SNYDER COMPANY, INC., 5701 Washington Ave.	UN 1-6116
Kansas City 12, Missouri	POWER SPECIALTIES CO., 1214 W. 47th St.	JE 1-6550
Lafayette, Louisiana	OIL & GAS SPECIALTIES CO., P. O. Box 1424	CE 5-4444
Louisville, Kentucky	THE ABBOTT COMPANY, 366 Francis Building	JU 4-4713
Marietta, Ohio	PROCESS INSTRUMENTS & EQUIPMENT CO., 110 Knox St.	FR 4-6767
Memphis 12, Tennessee	ENGINEERED INSTRUMENT SALES CO., 2717 Union Ave.	FA 3-1275
Minneapolis 9, Minnesota	ENGINEERED SALES CO., 314 W. 38th St.	TA 4-0696
Monterey Park, California	BARTON SALES COMPANY, 350 S. Atlantic Blvd.	AT 9-3549
New Orleans 12, Louisiana	OIL & GAS SPECIALTIES CO., P. O. Box 10246	FO 1-9914
New York City, New York	BLAKE INSTRUMENT CORP., 409 Grand Ave., Englewood, New Jersey	LO 4-4815
Odessa, Texas	*SNYDER COMPANY, INC., 709 West County Road	FE 2-9408
Phoenix, Arizona	CONE & WALLACE CO., 1325 S. 26th St.	BR 5-4496
Philadelphia 40, Penn.	TEST EQUIPMENT SALES CO., 4447 N. Bodine St.	DA 9-1822
Pittsburgh 5, Penn.	M. S. JACOBS & ASSOCIATES, 810 Noblestown Road	WA 1-6140
Portland 1, Oregon	FRYER AND CO., INC., 2035 S. W. 58th Ave.	CA 6-3733
Salt Lake City, Utah	PROCESS EQUIPMENT CO., Suite 212, 29 E. 2nd S.	EL 5-9124
San Francisco 11, Calif.	BELILOVE COMPANY, 420 Market St.	YU 2-3713
St. Louis 22, Missouri	E. B. MILLER CO., 10117 Manchester Road	YO 6-8250
N. Syracuse, New York	O. R. LAWRENCE CO., 204 S. Main St.	GL 8-0910
Tulsa 20, Oklahoma	SNYDER COMPANY, INC., 1432 E. Sixth St.	GI 7-0126

Canada

Calgary, Alberta	*PRECISION OILFIELD SERVICES, LTD., 121 14th St.	AT 3-1650
Edmonton, Alberta	*PRECISION OILFIELD SERVICES, LTD., 7718 104th St.	3-7992
Estevan, Saskatchewan	*PRECISION OILFIELD SERVICES, LTD., P. O. Box 1033	4-2102
Lancaster, New Brunswick	K & A ENGINEERING CO., 30 O'Brien St.	OX 4-6120
Montreal, Quebec	JOHN PREFONTAINE, 359 Kensington Ave.	WE 7-4341
Sillery, Quebec	CHALEUR, INC., 1453 Pine Ave.	LA 7-1945
Toronto 5, Ontario	*BAKER INSTRUMENTS, LTD., 185 Davenport Rd.	WA 4-9708
Vancouver 4, B.C.	JOHN SHERMAN, 855 E. Hastings St.	MU 4-9109
Winnipeg, Manitoba	MACKAY-MORTON, LTD., 183 James Ave., East	WH 2-7231

Cuba

Havana	GUILLERMO E. OCHOA, San Lazaro 16	A 4873

Mexico

Mexico 19, D.F.	VICAL, S.A., Miguel Angel 96-98	24-31-34

SOUTH AMERICA

Anaco, Venezuela	*A-Z EXPORT, S.A.	
Buenos Aires, Argentina	KENNETH J. LANGLEY, Corrientes 1115	35-1842
La Paz, Bolivia	OIL INDUSTRY SUPPLY & SERVICE CO., Casilla 1268	3917
Las Maroches, Venezuela	*A-Z EXPORT, S.A.	
Maracibo, Venezuela	*A-Z EXPORT, S.A., Apartado 304, Hotel Del Largo	6892
Puerto La Cruz, Venezuela	*A-Z EXPORT, S.A., Apartado 4026	MG 086-332
Rio de Janeiro, Brazil	H. V. LAGE, Rua Mexico 45	42-8368
Talara, Peru	OILFIELD IMPORT, S.A., Apartado 71	

AFRICA

Transvaal

Elandsfontein Rail	NEGRETTI & ZAMBRA, LTD., Bell's Circle	58-2184/9
Johannesburg	NEGRETTI & ZAMBRA, LTD., Maritime House, P. O. Box 4378	23-1974/5

EUROPE & ASIA

Copenhagen V, Denmark	KRAGH-MULLER & ANDERSEN, H. C. Andersens Blvd. 4	
Genova, Italy	G. CASTELLAZO, Lungobisagno Istria 34	83318-876,873
The Hague, Holland	**BARTON-EUROPA, Zonweg 41	779874
Harlow, Essex, England	**SUNVIC CONTROLS, LTD., P. O. Box 1, Stone Cross	25271
London, W.C.2, England	SUNVIC CONTROLS, LTD., Crown House, Aldwych	Temple Bar 8040
Milano, Italy	FABBRICHE ELETTROTENICHE RIUNITE, SPA, Via Canova N. 12	346851
Minden-Westfalen, Germany	**SCHOPPE & FAESER, G.M.B.H., Schillerstr. 72	Fernrufsammelnur 3631
Paris 18e, France	PROMESUR, 19 Rue Eugene Carriere	ORN 37-89
Stockholm, Sweden	A. B. KIHLSTROMS MANOMETERFABRIK, Malmsgardsvagen 63	23-22-05
Tokyo, Japan	**HOKUSHIN ELECTRIC WORKS, LTD., 312 Shimomaruko-Cho, Ota-ku	Kamata (73)-2241

*Operate Repair Stations.
**Operate Repair Stations, and are licensed to manufacture.

BARTON INSTRUMENT CORPORATION | 580 MONTEREY PASS ROAD MONTEREY PARK, CALIFORNIA

CIRCLE 378 ON READER-SERVICE CARD

Bendix Aviation Corp., Utica Div., 211 Seward Ave., Utica N. Y. SWift 7-2500

Bergen Labs., Inc., 247 Crooks Ave., Clifton N. J. GR-3-7800

Berger & Sons, Inc., C. L., 37 Williams St., Boston 19, Mass. HIghland 5-1870

Berkeley Dynamics, 2831-7th St., Berkeley 10, Calif. TH-3-2788 or TH-8-0382

Berkshire Laboratories, 582 Bank Village, Greenville, N. H. Greenville 111

Bernco Engineering Corp., 2320 So. Tibbs Ave., Indianapolis 41, Ind. CHapel 1-2871

Beva Laboratory, Inc., P.O. Box 478, Trenton 9, N. J. EXport 4-4074

Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.
(See advertisement on pages 52, 103, 104, 105)

Biggs Co., Carl H., 1547-14th St., Santa Monica, Calif. GRanite 80461

Bin-Dicator Co., 13946 Kercheval, Detroit 15, Mich. VA 2-6952
(See advertisement on page 60)

Biophysical Electronics, Inc., 20 Herman St., Philadelphia 44, Pa. GErmantown 8-5260

Bird & Co., Inc., Richard H., 1 Spruce St., Waltham 54, Mass.
(See advertisement on page 152, 161)

Bishop & Co., J., Platinum Works, E. King St., Malvern, Pa. NIagara 4-3100

Black, Sivalls & Bryson, Inc., Controls Div., 302 N. Cincinnati, Tulsa, Okla. GIbson 7-8441

Blickman, Inc., S., 516 Gregory Ave., Weehawken, N. J.

Bliley Electric Co., 200 Union Station Bldg., Erie, Pa.

Blue M Electric Co., 138th & Chatham St., Blue Island Ill. FUlton 5-9000

Bock Machine Co., 2950 Jonrose Ave., Cincinnati 39, Ohio. JA-2-1171

Bodine Electric Co., 2500 W. Bradley Place, Chicago 18, Ill. IRving 8-3515

Boehm Co., R. A., 58 Brooklyn Ave., Merrick, N. Y.

Boehme, Inc., H. O., 915 Broadway, New York 10, N. Y. SPring 7-2208

Bogart Manufacturing Corp., 315 Seigel St., Brooklyn 6, N. Y. HY-7-4972

Boone Instrument Co., 130 E. 7th St., New York 9, N. Y. ORegon 7-6996

Boonton Electronics Corp., 738 Speedwell Ave., Morris Plains, N. J.

Borden Chemical Co., Resinite Dept., P.O. Box 1589, Santa Barbara, Calif. WOodland 3134

Borg Equipment Div., Amphenol-Borg Electronics Corp., 120 So. Main St., Janesville, Wis. PL-4-6616
(See advertisement on page 148)

Boston Gear Works, Quincy 71, Mass. PR-3-0400

Boulin Instrument Corp., 10 First St., North Palham, N. Y.
(See advertisement on page 62)

Bourns, Inc., P.O. Box 2112, Riverside, Calif. OVerland 4-1700
Authorized Factory Source
Schweber Electronics
60 Herricks Rd., Mineola, L. I., N. Y.
Pioneer 6-6520

Bowen Corp., 11 University Rd., Cambridge 38, Mass. UNiversity 4-6170

Bowmar Instrument Corp., 8000 Bluffton Rd., Fort Wayne, Ind. SHerwood 3121

Bowser Inc., 1302 E Creighton Ave., Ft. Wayne 2, Ind. H-2341

Brabender Corp., 244 Saddle River Rd., Rochelle Park, N. J. HUbbard 7-0214-5

Brabender Instruments Inc., C. W., 50 E. Wesley St., South Hackensack, N. J. DIamond 3-4425

Brach Manufacturing Corp., 200 Central Ave., Newark 3, N. J. HUmboldt 2-1500

Bracke-Seib X-Ray Co., Inc., 16 Pelham Bay Park West, Pelham Manor, N. Y. PElham 8-4346

Brainin Co., C. S., 320 Washington St., Mt. Vernon, N. Y. MO-8-5500
(See advertisement on page 159)

Brand & Co., Inc., Wm., 47 North St., Willimantic, Conn. HArrison 3-6301

Branson Instruments, Inc., 37 Brown House Rd., Stamford Conn. DAvis 4-6721

Branson Ultrasonic Corp., 37 Brown House Rd., Stamford, Conn. Fireside 8-7781
(See advertisement on page 112)

Breeze Corporations Inc., 700 Liberty Ave., Union, N. J.

Brew & Co., Richard D., 90 Airport Rd., Concord, N. H. CApitol 5-6606

Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., 155 Hill St., Milford, Conn. TRinity 8-1721
(See advertisement on pages 149, 150)

Brinkmann & Co., C. A., Inc., 115 Cutter Mill Road, Great Neck, L. I., N. Y.

Bristol Co., Waterbury 20, Conn. PLaza 6-4451
(See advertisement on pages 31, 39, 41, 46, 57, 65)

Bristol Brass Corp., 580 Broad St., Bristol, Conn. LUdlow 2-3161

British Industries Corp., Div. of Special Instruments, 80 Shore Rd., Port Washington, N. Y. PO-7-7700
(See advertisement on page 170)

Bronoptics Co., 1665 Oak Knoll Ave., San Marino, Calif. SY-9-1022

Brookfield Engineering Labs., Inc., 240 Cushing St., Stoughton, Mass. FIeldbrook 4-4310

Brooks Rotameter Co., 407 W. Vine St., Hatfield, Pa. ULysses 5-5174
Pittsburgh Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa.
WAlnut 1-6140

Brunswick Instruments, P. O. Box 813, New Brunswick, N. J. CHarter 7-5919

Brush Instruments Div., Clevite Corp., 37th & Perkins, Cleveland 14, Ohio. ENdicott 1-3315
(See advertisement on pages 82, 83)

Bryant Computer Products Div., Clinton St., Springfield, Vt. TUrner 5-2141

SALES OFFICES

General Office
Bryant Computer Products Division
P.O. Box 620, Springfield, Vermont
Telephone: TUrner 5-2141
P. L. Smith, Sales Manager

Chicago
Bryant Computer Products Division
5454 West Higgins Avenue
Chicago 30, Illinois
Telephone: KIldare 5-3228
Ray Ramon

Los Angeles
Bryant Computer Products Division
12200 South Bellflower Boulevard
Downey, California
Telephone: TOpaz 1-9258
Tim Foley

Sales Representatives

Roslyn, Long Island, New York
Mr. John Wilds, Wild & Associates, Inc.
1519 Northern Boulevard
Telephone: MAyfair 1-8660

La Canada, California
Mr. H. W. Ruby, R & D., Inc.
P.O. Box 308
Telephone: MUrray 1-5845

Buchanan Electrical Products Corp., 504 U. S. 22, Hillside N. J. WAverly 3-7474

Bud Radio, Inc., 2118 East 55th St., Cleveland 3, Ohio HEnderson 1-7166
(See advertisement on page 156)

Budd Stanley Co., Inc., 43-01-22nd St., Long Island City, N. Y. STillwell 6-1706

Buffalo Meter Co., 2906 Main St., Buffalo, New York
(See advertisement on page 36)

BUFFALO METER REPRESENTATIVES

Albany 5, New York
Energy Control Co., Inc.
1203 Central Avenue
Phone: Albany 2-2338

Amarillo, Texas
Snyder Company, Inc.
3615 S. Lipscomb
Phone: FL-6-5471

Altanta 24, Georgia
Boiler Equipment Service Co.
P.O. Box 13138
Phone: Melrose 4-7373

Baltimore 18, Maryland
H. P. Rodgers
100 W. 25th Street
Phone: Liberty 2-2122, 2-9919

Birmingham 9, Alabama
Hayden Engineering Sales Co.
210 Hollywood Blvd.
Phone: Tremont 1-0637

Burlingame, California
T. R. Routh Co.
1209 Capuchino Ave.
Phone: Diamond 2-4147

Boston 10, Massachusetts
Control Instruments, Inc.
55 Batterymarch St.
Phone: Hancock 6-6416

Charleston 24, West Virginia
Engineering Products Co.
P.O. Box 1107
Phone: Dickens 3-9411

Charlotte 1, North Carolina
Mec-Tric Control Co.
P. O. Box 209
Phone: Franklin 6-8531

Chicago 10, Illinois
Meters and Controls, Inc.
444 N. LaSalle Street
Phone: Whitehall 4-1448

Cincinnati 37, Ohio
Chapman Engineering Sales Co.
1717 Section Road
Phone: Elmhurst 1-3140

Cleveland 23, Ohio
Illes Power Control Co.
22700 Shore Center Drive
Phone: Redwood 2-9300

Dallas 35, Texas
Snyder Company, Inc.
6234 Peeler Street
Phone: Fleetwood 2-0760

Denver 5, Colorado
Joy and Cox, Inc.
2124 Broadway
Phone: Amherst 6-0323

Des Moines 9, Iowa
Deco Engineering Products
1112 Locust Street
Phone: Atlantic 8-5721

Detroit 12, Michigan
Metrol Company
7145 E. Davidson
Phone: Twinbrook 3-6300

El Paso, Texas
Steel and Engineering Prod. Co.
P.O. Box 3626
Phone: 3-5521

Honolulu 17, Hawaii
H. S. Gray Co.
P.O. Box 3016

Houston 24, Texas
Snyder Company, Inc.
P.O. Box 19134
Phone: Underwood 1-6116

Indianapolis 4, Indiana
DeHaven Engineering Co.
1444 Consolidated Bldg.
115 North Penn Street
Phone: Melrose 2-2563

Kalamazoo, Michigan
Metrol Company
420 W. South Street
Phone: Fireside 2-6097

Kansas City 14, Missouri
Economy Equipment Company
7341 Broadway
Phone: Jackson 3-1010

Knoxville 5, Tennessee
Leinart Engineering Company
412 Fifth Avenue, N. E.
Phone: 5-0363

Los Angeles 22, California
W. B. Ladewig Co.
5608 E. Washington Blvd.
Phone: Raymond 3-6371

Louisville 16, Kentucky
Control Products Company
P. O. Box 56
Phone: Juniper 4-4900

Memphis 6, Tennessee
Process and Power Inc.
P.O. Box 10138
Phone: Whitehall 5-3253

Milwaukee 4, Wisconsin
Geo. H. Fredricks & Co., Inc.
4383 N. Green Bay Avenue
Phone: Concord 4-1070

Minneapolis 2, Minnesota
Power Process Equip., Inc.
746 Builders Exchange Building
Phone: Federal 2-8861

New Orleans 19, Louisiana
Frieshon & Belsom
P.O. Box 7044
Phone: Vernon 5-3165

New York 38, New York
Energy Control Co., Inc.
5 Beekman Street
Phone: Barclay 7-0457

North Haven, Connecticut
Energy Control Co., Inc.
2 Linsley Street
Phone: Cedar 9-2513

Odessa, Texas
Snyder Company, Inc.
709 West County Road
Phone: Federal 2-4802

Philadelphia, Pennsylvania
Flow Engineering, Inc.
P.O. Box 476
Flourtown Pennsylvania
Phone: Chestnut Hill 8-1355

Pittsburgh 5, Pennsylvania
M. S. Jacobs & Associates, Inc.
810 Noblestown Road
Phone: Walnut 1-6140

Richmond 20, Virginia
Berkness Control & Equipment Corp.
308 W. Cary St.
Phone: Milton 3-5357

St. Louis 8, Missouri
Economy Equipment Company
4526 Olive Street
Phone: Forest 7-5328

Salt Lake City, Utah
Joy and Cox, Inc.
415 Judge Building
Phone: Empire 3-2769

Santurce 1, Puerto Rico
Ramon I. Gil
P.O. Box 9182, Santurce Station

Seattle 4, Washington
The Burhans-Sharpe Company
1743 First Avenue S.
Phone: Main 9006

Tulsa 20, Oklahoma
Snyder Company, Inc.
1432 East Sixth Street
Phone: Gibson 7-0126

Buff & Buff Mfg Co., 329 Lamartine St., Jamaica Plain, Mass. JAmaica 4-1770
(See advertisement on page 201)

SURVEYING INSTRUMENTS
and accessories
BUFF AND BUFF MFG. CO.
329 Lamartine St.
Jamaica Plain 30, Mass.
CIRCLE 379 ON READER-SERVICE CARD

Buhl Optical Co., 1009 Beech Ave., Pittsburgh 33, Pa. PAirfax 1-0076

Bulova Research & Development Labs., Inc., 62-10 Woodside Ave., Woodside 77, N. Y. NEwtown 9-5700

Bulow Electric Co., 11000 Capital Ave., Oak Park 37, Mich. LI 7-1133

Bureau of Engraving Inc., Industrial Div., 500 So. 4th St., Minneapolis 15, Minn. FE-9-8721

Burgess Battery Co., Div. of Servel, Inc., Foot of Exchange, Freeport, Ill. AD-2-2161
(See advertisement on page 153)

Burke & James, Inc., 321 So. Wabash Ave., Chicago 4, Ill. HArrison 7-8393

Burling Instrument Co., 18 River Rd., Chatham, N. J. MErcury 5-9481
(See advertisement on page 63)

Burndy Corp., Omaton Div., Richards Ave., Norwalk, Conn. TEmple 8-4711

Burnell & Co., Inc., 10 Pelham Parkway, Pelham Manor, N. Y. PE-8-5000

Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa. GRant 1-2527

Burroughs Corp., 6071 Second Ave., Detroit 2, Mich. TR-5-2260

Burroughs Corp., Electronic Tube Div., P. O. Box 1226, Plainfield, N. J. PL 6-0876
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Burton Mfg. Co., 2520 Colorado Ave., Santa Monica, Calif. TExas 0-7561

Burton-Rogers Co., Sales Div., Hoyt Electrical Instrument Works, 42 Carleton St., Cambridge 42, Mass. EL-4-1643

Bush Associates, G. F., Box 175, Princeton, N. J.

Bushnell & Co., D. P., Bushnell Bldg., Pasadena, Calif. RYan 1-8143

Bussmann Manufacturing Div., McGraw-Edison Co., University at Jefferson, St. Louis 7, Mo. GAfriel 1-1740

Bytrex Corp., 50 Hunt St., Newton 58, Mass. WA-6-6380
(See advertisement on page 60)

C

CBS Electronics, 100 Endicott St., Danvers, Mass. SPring 4-2360

CGS Laboratories, Inc., Routes 7 and 35, Ridgefield, Conn. IDlewood 8-6571

CDC Control Services, Inc., 400 S. Warminster Rd., Hatboro, Penna.

C & K Components, Inc., 101 Morse St., Newton 58, Mass. WAtertown 3-0524

Caddell-Burns Mfg. Co., Inc., 40 E. 2nd St., Mineola, N. Y. PIoneer 6-2310

Cahn Instrument Co., 14511 Paramount Blvd., Paramount, Cal. NE 69456 (Los Angeles)

Caig Laboratories, 46 Stanwood Road, New Hyde Park, L. I., N. Y. PIoneer 2-0278

California Chassis Co., 5445 E. Century Blvd., Lynwood, Calif. NEvada 6-9931

California Magnetic Control Corp., 11922 Valerio St., No. Hollywood, Calif. STanley 7-1104

Calif. Technical Indus. Div. of Textron, Inc., 1421 Old County Road, Belmont, Calif. LYtell 3-8466

Calumet Engineering Co., 2246 Calumet Ave., Chicago 16, Ill. DAnube 6-6858

Cambridge Instrument Co., Inc., Grand Central Terminal, New York 17, N. Y. Murray Hill 6-0335

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass. TRowbridge 6-2800

Camera Equipment Co., Inc., 315 W. 43rd St., New York 36, N. Y. JU-6-1420

Campbell Co., Inc., Colin, P.O. Box 529, Miry Brook Rd., Danbury, Conn. PIoneer 3-6701

Canadian Marconi Co., 2442 Trenton Ave., Montreal, P. Q., Canada. REgent 8-9441

Cannon Electric Co., 3208 Humboldt St., Los Angeles 31, Calif. CApitol 5-1251
Authorized Factory Source
Schweber Electronics
60 Herricks Rd., Mineola, L. I., N. Y.
PIoneer 6-6520

Cannon Instrument Co., P.O. Box 812, State College, Pa. Phone—Boalsburg, Pa. HO-6-6233

Capeway Instrument Corp., No. Bedford St., E. Bridgewater, Mass. DRake 8-2921

Capitron Div., AMP Inc., 155 Park St., Elizabethtown, Pa. EMpire 7-1105

Cargill Detroit Corp., 2254 Cole Ave., Birmingham, Mich.

Carlson Co., 3457 Weidner Ave., Oceanside, L. I., N. Y. ROckville Centre 4-8181

Carol Electronics Corp., 315 W. Stephen St., Martinsburg, W. Va. AMherst 7-8911

Carpenter Steel Co., 125 W. Bern St., Reading, Pa. FRanklin 4-8211

Carruthers & Fernandez, Inc., 1501 Colorado Ave., Santa Monica, Calif. EXbrook 4-6768

Carter Mfg. Corp., 23 Washington St., Hudson, Mass. HUdson 1309

Carter Motor Co., 2711 W. George St., Chicago 18, Ill. JU 8-7700

Cash Co., A. W., 540 N. 18th St., Decatur, Ill. Telephone 8-3401
Pittsburgh Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa.
WAlnut 1-6140

Cash Valve Mfg. Corp., A. W., 666 E. Wabash Ave., Decatur, Ill. Telephone 2-8574

Cassell Co., John R., 110 West 42nd St., New York 36, N. Y. WIsconsin 7-7678

Central Electronic Mfrs., Div. Nuclear Corp. of America, 2 Richwood Place, Denville, N. J. OAkwood 7-4200

Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill.
(See advertisement on page 126)

Centralab, Div. of Globe-Union Inc., 900 E. Keefe Ave., Milwaukee 12, Wis. WOodruff 2-9200

CENTRALAB SALES REPRESENTATIVES

CALIFORNIA: San Francisco
Logan Sales Co.
154 Eighth St., Hemlock 1-0692
CALIFORNIA: Beverly Hills
Walter S. Harmon Co.
P.O. Box 1380, Olympia 2-5616
COLORADO: Denver
McLoud & Raymond Co.
5403 E. Evans, Skyline 6-1589
GEORGIA: Atlanta
Frank Nickerson
1202 Zonolite Rd. N.E., Trinity 5-8908
ILLINOIS: Chicago
F. L. Tiegs & A. A. MacDonald
5308 W. Diversey, Palisade 5-5366
INDIANA: Indianapolis
L. M. DeVoe Co.
4010 Washington Blvd., Atwater 3-1395
IOWA: Cedar Rapids
Jerry Vrbik
615 Guaranty Bldg., Empire 4-0833
MASSACHUSETTS: Needham
Stanley A. Harris Co.
1241 Highland Ave., Hillcrest 4-4780
MICHIGAN: Detroit
R. C. Merchant
18411 W. McNichols Rd., Kenwood 5-6000
MINNESOTA: Minneapolis
Merrill K. Franklin
338 E. Franklin, Federal 6-2315
MISSOURI: Kansas City
E. W. McGrade
Box 8876, Prairie Village Sta., Randolph 2-0758
MISSOURI: St. Louis
Theodore B. Lowell
Box 21, Normandy Branch, Evergreen 5-7803
NEW JERSEY: Nutley
D. P. Galasso
382 Franklin Ave. North 1-1300
NEW YORK: Dewitt
George P. Marron
4455 E. Genessee, Gibson 6-1974
NEW YORK: Syracuse
Wilson H. Zimmerman
112 DeWitt, Granite 4-4889
OHIO: Brecksville
Allen Nace Co.
7601 Parkview Rd., Jackson 6-4323
PENNSYLVANIA: Philadelphia
S. K. MacDonald, Inc.
1531 Spruce St., Kingsley 5-1205
PENNSYLVANIA: Philadelphia
Jerome Bresson
246 Haverford Ave., Greenwood 7-3800
TENNESSEE: Memphis
Al S. Engelman
3205 Crump Avenue, Glendale 8-6263
TEXAS: Dallas
Robert E. Nesbitt
1925 Cedar Springs, Riverside 7-5824
WASHINGTON: Seattle
J. J. Backer Co.
221 Galer St., Atwater 3-6470
CANADA: Toronto
P. J. Heenan Co.
804 Mt. Pleasant Rd., Hudson 1-2291
CANADA: Vancouver
D. E. McLennan
1624 W. Third Ave. Bayview 2898
HAWAII: Honolulu
Jim Hastin Sales Co.
P.O. Box 2098-998910

Century Electronics & Instruments, Inc., 1333 N. Utica, Tulsa 10, Okla. LUther 4-7111

Ceramaseal, Inc., P.O. Box 25, New Lebanon Center, N. Y. W. Lebanon 3-5851

Ceramatronics, Inc., 364 Highland Ave., Passaic, N. J. GRegory 3-8274

Cerro de Pasco Sales Corp., 300 Park Ave., New York 22, N. Y. MUrray Hill 8-8822

Chadwick-Helmuth Co., 472 E. Duarte Rd., Monrovia, Calif. EL 84567

Chart-Pak, Inc., 1 River Rd., Leeds, Mass. JUstice 4-5446 (Northampton)

Chatillon, John & Sons, 85 Cliff St., New York 38, N. Y. BEekman 3-2552

Chemalloy Electronics Corp., Gillespie Airport, Santee, Calif.

Chemiquip Co., 36 East 10th St., New York 3, N. Y. GRamercy 7-3772

Chesapeake Instrument Corp., Shadyside, Md. UNIversity 7-2151

Chester Cable Corp., Chester N. Y., HOmestead 9-2141

Chicago-Allis Mfg. Corp., 113-125 N. Green St., Chicago 7, Ill. MO 6-5050

Chicago Minature Lamp Works, 1500 N. Ogden Ave. Chicago 10, Ill. MOhawk 4-1741
California & Southwest Representative
The George Agency
101 Verduga Avenue
Burbank, Calif., Victoria 9-3140
Northwest Representative
James J. Backer Company
221 West Galer Street
P.O. Box 9077
Seattle 99, Wash. ATwater 3-6470
Northeastern United States Representative
Hoffman Engineering Corp.
183 R. Sound Beach Ave.
Old Greenwich, Conn. NEptune 7-3557

Chicago Standard Transformer Corp., 3501 W. Addison St., Chicago 18, Ill. INdependence 3-7400

Chrono-Log Corp., Box 4587, Philadelphia 31, Pa. LOcust 7-5178
(See advertisement on page 86)

Churchill Lighting Corp., 344 Franklin St., Melrose 76, Mass. NOmandy 5-4700

Cincinnati Time Recorder Co., 1733 Central Ave., Cincinnati 14, Ohio. CHerry 1-1995

Circle Seal Products Co., Inc., 2181 E. Foothill Blvd., Pasadena, Calif. MUrray 1-4966
Northern California Representative
Power Transmission Engineering Corp.
86 Keyes St., San Jose, Calif.
CYpress 4-8181

Circo Ultrasonic Corp., 51 Terminal Ave., Clark, N. J.

Circon Component Corp., Santa Barbara Municipal Airport, Goleta, Calif. WOodland 7-1113
(See advertisement on page 193)

Clare & Co., C. P., 3101 Pratt Blvd., Chicago 45, Ill. AMbassador 2-7700

Clark Controller Co., 1146 E. 152nd St., Cleveland 10, Ohio. ULster 1-2000

Clark-Cooper Co., Inc., 305 Market St., Palmyra (Burl. Cty) N. J. TAlmadge 9-1447

Clark Flexible Link Shaft Co., P. O. Box 73, Newton Highlands 61, Mass.

Clark Manufacturing Co., 1830 E. 38th St., Cleveland 14, Ohio. EX 1-1414
Pittsburgh Area Representative
Forbes-Western, Inc.
940 Western Ave., Pittsburgh 33, Pa.
ALlegheny 1-9400

Clarostat Mfg. Co., Inc., Dover, N. H., SIlverwood 2-1120

Clary Corp., Electronics Div., 404 Junipero St., San Gabriel, Calif. ATlantic 7-6111

Clegg Laboratories, Div. of Clegg, Inc., Ridgedale Ave., Morristown, N. J. JE 8-7214

Cleveland Worm & Gear Co., 3300 E. 80th St., Cleveland 4, Ohio. VU 3-4560

Clevite Transistor Products Div., Clevite Corp., 241 Crescent St., Waltham 54, Mass. TWinbrook 4-9330

Clifton Precision Prods. Co., Inc., Marple at Broadway, Clifton Heights, Pa. HIlltop 9-1200 (Sales)

Clough-Brengle Co., 6014 N. Broadway, Chicago 40, Ill. AMbassador 2-2200

Coast Coil Co., 5333 W. Washington Blvd., Los Angeles 16, Calif. WE 6-6188

Coast Instrument, Inc., 4811 Long Beach Blvd., Long Beach, Calif. NEvada 6-7683

Cobehn, Inc., 226 Passaic Ave., Caldwell, N. J. CApital 6-6675

Coleman Electronics, Inc., 133 East 162nd St., Gardena, Calif. FAculty 1-4775

Coleman Engineering Co., Inc., 3500 Torrance Blvd., Torrance, Calif. FAculty 1-3900

Coleman Instrument Co., Inc., 716 So. Troost, Tulsa 16, Okla. LUther 7-6691

Coleman Instruments, Inc., 42 Madison St. Maywood, Ill.

Collectron Corp., 304 E. 45th St., New York City 17, N. Y. MU 9-7120

Collins Corp., G. L., 2820 E. Hullett St., Long Beach 5, Calif. MEtcalf 0-3121

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa. EMpire 30281

Colonial Kolonite Co., 2232 W. Armitage Ave., Chicago 47, Ill. CApitol 7-0300

Columbia Electric Mfg Co., 4519 Hamilton Ave., Cleveland 14, Ohio. ENdicott 1-8060

Columbia Technical Corp., 61-02 31st Ave., Woodside 77, N. Y. AS 8-7401

Colvin Laboratories, Inc., 364 Glenwood Ave., East Orange, N. J. ORange 7-1221
(See advertisement on page 52)

Comar Electric Co., 3349 Addison St., Chicago 18, Ill. JUniper 8-2410
(See advertisement on page 173)

Commercial Iron Works, 2424 Porter St., Los Angeles 21, Calif. MAdison 7-1051
(See advertisement on page 45)

DISTRIBUTORS OF COMMERCIAL ORIFICE FITTINGS

ALABAMA, WEST FLORIDA, NORTHERN MISSISSIPPI, CENTRAL TENNESSEE
Hudson Engineering Co., Inc.
1831 28th Ave. South, Birmingham 9, Ala.

ARKANSAS, KANSAS, OKLAHOMA
Vickery-Simms, Inc.
201 Enterprise Bldg., Tulsa, Oklahoma

CALIFORNIA
Paul Robinet & Co.
420 Market St., San Francisco 11, Calif.

COLORADO, MONTANA, UTAH, WYOMING
L. A. Christopher Co.
1715 York St., Denver 6, Colorado

DELAWARE, MARYLAND, S. NEW JERSEY, E. PENNSYLVANIA, VIRGINIA
Delaware Valley Engineering Co., Inc.
Forest & Hector Sts., Conshohocken, Pa.

FLORIDA PENINSULA, GEORGIA, EASTERN TENNESSEE
Jack M. Smither & Co.
3166 Maple Dr. N. E., Atlanta 5, Georgia

LOUISIANA
Coastal Engineering Co.
P.O. Box 1366, New Orleans 13, La.

NORTHERN NEW JERSEY, NEW YORK CITY METROPOLITAN AREA
Malcom W. Black & Co., Inc.
41 East 42nd St., New York 17, N. Y.

NEW YORK CITY METRO. AREA (EXPORT)
Black Export, Inc.
41 East 42nd St., New York 17, N. Y.

WEST NEW YORK, WEST PENNSYLVANIA, WEST VIRGINIA
M. S. Jacobs & Associates, Inc.,
810 Nobelstown Rd., Pittsburgh 5, Pa.

NORTH CAROLINA, SOUTH CAROLINA
Mason & Morris, Inc. (Box 1903)
1726 Hutchison Ave., Charlotte 1, N. C.

SOUTH & EAST TEXAS
Maintenance Mechanical Corp.
P.O. Box 2637, Houston 1, Texas

NORTH TEXAS
Vickery-Simms, Inc.
P.O. Box 67, Arlington, Texas

TEXAS PANHANDLE, OKLAHOMA PANHANDLE, W. KANSAS
James S. Kone & Co.
1701 N.E. Fourth St., Amarillo, Texas

WEST TEXAS, NEW MEXICO
Beal Equipment Co.
P.O. Box 3894, Odessa, Texas

MEXICO
Schultz Y Cia., S. A.
Lago Xochimilco 345, Mexico 17, D. F.
Aramberri, 509 Pte., Monterey, N. L. Mex

CANADA
Peacock Brothers, Ltd.,
Head Office: P.O. Box 1040, Montreal 3, Quebec.
Branch Offices: 1029 11th Ave. S. W., Calgary, Alberta; 10323 78th Ave., Edmonton, Alberta; 2325 Burrard, Vancouver 9, B.C.; 168 Market St., Winnipeg 2, Manitoba; P.O. Box 968, Sydney, Nova Scotia; 105 Durham St. S., Sudbury, Ontario; 1669 Eglinton Ave. W., Toronto 10, Ontario; 310 Victoria Ave., Montreal 6, Quebec.

Commercial Plastics Co., 945 George St., Chicago 14, Ill. GRace 7-8220

Communication Accessories Co., U. S. Highway 50 and 71 By-Pass, Lee's Summit, Mo. BRoadway 1-1700

Communication Measurements Lab., Inc., 350 Leland Ave., Plainfield, N. J.

CompuDyne Corp., 400 S. Warminster Rd., Hatboro, Penna.

California Representative
Luscombe Engineering Co.
1129 So. Fair Oaks Ave., Pasadena, Calif. MU-2-3386
Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229
130 N. "B" St., San Mateo, Calif. DI-2-7057

Computer Control Co., Inc., 983 Concord St., Framingham, Mass. TRinity 5-6185

Western Division
R. D. Chamorro, Sales Manager
2251 Barry Ave., Los Angeles 64, Calif.
GRanite 8-0481, BRadshaw 2-9135

Computer Equipment Corp., 1931 Pontius Ave., Los Angeles 25, Calif. GRanite 8-0464

Computer Instruments Corp., 92 Madison Ave., Hempstead, L. I., N. Y. IVanhoe 3-8200

Computer Measurements Corp., 5528 Vineland Ave., North Hollywood, Calif.
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Conant Bros. Co., Inc., 427 Riverside Ave., Medford 55, Mass. EXport 5-2240

Conant Laboratories, Box 3997, Bethany Station, Lincoln 5, Neb. Telephone 4-0432

Conax Corp., 2300 Walden Ave., Buffalo 25, N. Y. REgent 0600

Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa. LOcust 7-7560
(See advertisement on pages 48, 51, 71, 161)

Conrad, Inc., 141 Jefferson St., Holland, Mich. EXport 2-3161

Consolidated Controls Corp., 11 Durant Ave., Bethel, Conn.

Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Pasadena, Calif. SYcamore 6-9381

Consolidated Systems Corp., 1500 So. Shamrock Ave., Monrovia, Calif. ELliott 9-8211

Consolidated Vacuum Corp., 1775 Mt. Read Blvd., Rochester 3, N. Y. GLenwood 3-7972
(See advertisement on page 70)

Contact, Inc., Main St., Maynard, Mass. TW 7-2642

Continental-Diamond Fibre Corp., Newark, Del. ENdicott 8-8531

Continental Equipment Co., Div. of Fisher Governor Co., 200 Main St., Coraopolis, Penna. AM-4-3010

Representative—So. California Area
B. R. Jones & Company
2334 E. 8th St., Los Angeles 21, Calif.
MAdison 7-1867

Continental Pump Co., 1027 So. Vandeventer, St. Louis 10, Mo. JEfferson 1-2840

Continental Screw Co., 459 Mt. Pleasant St., New Bedford, Mass. WY 3-2621

Control Data Corp., 501 Park Ave, Minneapolis 15, Minn. FEderal 9-0947

Control Panel Corp., 517 W. Monroe St., Chicago 6, Ill. DEarborn 2-3228

Control Products Inc., 306 Sussex St., Harrison, N. J. HU. 2-0213

Control Technology Co., 1186 Broadway, New York 1, N. Y. ORegon 9-2770

Controls Co. of America, 9555 Soreng Ave., Schiller Park, Ill. NA 5-9000

Cook Co., Frank R., 3850 Olive St., Denver 7, Colo. FLorida 5-3531

Cooper Development Corp., 2626 So. Peck Rd., Monrovia, Calif. HIllcrest 6-3138

Coors Porcelain Co., 600 9th St., Golden, Colorado. CR 9-4533

Copease Corp., 425 Park Ave., New York 22, N. Y. PLaza 3-6692

Corbett Science Labs., F. W., 3117 Venice Blvd., Los Angeles 19, Calif. REpublic 3-5251

Corbin Cabinet Lock Div., 102 Washington St., New Britain, Conn. BAldwin 5-7411

Corning Glass Works, Corning, N. Y. Telephone 2-5011

Corson Electric Mfg. Corp., 540 - 39th St., Union City, N. J. UNion 6-4227

Cosa Corp., 405 Lexington Ave., New York 17, N. Y. YUkon 6-9696

Coulter Industrial Sales Co., P. O. Box 22, Elmhurst, Ill. TErrace 2-5653

Cox Instruments Div., Geo. L. Nankervis Co., 15300 Fullerton, Detroit 27, Mich. VErmont 8-5780

Cramer Controls Corp., Centerbrook, Conn., SOuth 7-8255

Crawford Co., C. B., 16606 Waterloo Rd., Cleveland 10, Ohio. KE 1-5415

Crawford Fitting Co., 884 East 140th St., Cleveland 10, O. Liberty 1-5533
(See advertisement on page 147)

Rep—Pittsburgh, Pa., Charleston, W. Va.
Fogleman Co., Inc.
3849 Willow Ave., Pittsburg 34, Pa. LE-1-4005
510 "C" St., S. Charleston 3, W. Va. RI-4-8401

Crescent Insulated Wire & Cable Co., P. O. Box 850, Trenton 5, N. J. EXport 6-9111
(See advertisement on page 144)

Rep—Pittsburgh, Pa., Charleston, W. Va.
Fogleman Co., Inc.
3849 Willow Ave., Pittsburgh 34, Pa. LE-1-4005
510 "C" St., S. Charleston 3, W. Va. RI-4-8401

Crest Instrument Co., 11808 S. Bloomfield Ave., Santa Fe Springs, Calif. UNiversity 3-4781

Croname Inc., 6251 Howard St., Chicago 48, Ill. NIles 7-6100

Crosby Valve & Gage Co. - The Ashton Valve Co., 43 Kendrick St., Wrentham, Mass. EVergreen 4-3121

Crucible Steel Co. of America, P. O. Box 2518, Pittsburgh 30, Pa. ATlantic 1-3800

Crump Instrument Corp. (Subsidiary of Houston Instr. Corp.), 1520 Foley St., Houston 24, Tex. HOmestead 8-2969
(See advertisement on page 64)

Crystal Glass Tube & Cylinder Co., 7310 S. South Chicago Ave., Chicago 19, Ill. DO-3-3277
(See advertisement on page 190)

Cubic Corp., 5575 Kearny Villa Road, San Diego 11, Calif. BRowning 7-6780

Cunningham, Son & Co., Jas., 33 Litchfield St., Rochester 8, N. Y. Baker 5-7240

Curtis Laboratories, Inc., 2718 Griffith Park Blvd., Los Angeles 27, Calif. NOrmandy 2-1176

Curtiss-Wright Corp., Electronics Div., 631 Central Ave., Carlstadt, N. J. GEneva 8-4000. IMI Branch, 4401 Lunada Ave. SE, P. O. Box 8324, Albuquerque, N. Mex. AMherst 8-8791

Cushman Precision Industries, 262 Alexander St., Princeton, N. J. WAlnut 1-7008

Custom Scientific Instruments, Inc., 541 Devon St., Kearny, N. J. WYman 1-6403

Customline Control Panels, Inc., 1379 East Linden Ave., Linden, N. J. HUnter 6-1272

Cutler-Hammer, Inc., 256 No. 12th St., Milwaukee 1, Wis. BRoadway 1-7800

D

D&R Ltd., 402 E. Gutierrez, P. O. Box 1500, Santa Barbara, Calif. WOodland 3116

Dage Television Div., Thompson-Ramo-Wooldridge, W. 10th St., Michigan City, Ind. TR 4-3251

Dahl Co., Geo. W., 86 Tupelo St., Bristol, R. I. CLifford 3-9500
(See advertisement on page 74)

Rep—W. Pa., W. Va., Md. Panhandle, Ohio Border
Sentinel Products Co. (Wayne B. Farley)
36 Beltzhoover Ave., Pittsburgh 10, Pa.
HEmlock 1-0774

Dalmotor Div., Yuba Consolidated Industries, Inc., 1375 Clay St., Santa Clara, Calif. CHerry 3-9414

Daniel Orifice Fitting Co., Inc., 9720 Katy Rd., Houston 24, Texas. HO 5-3451

Pittsburgh Area Representative
W. A. Stoeltzing, Inc.
940 Western Ave., Pittsburgh 33, Pa.
ALlegheny 1-9400

Darrill Products Corp., 95 Falmouth St., Attleboro, Mass. ATtleboro 1-4047

Datex Corp., 1307 So. Myrtle Ave., Monrovia, Calif. ELliott 9-5381

Datran Electronics, 1836 Rosecrans Ave., Manhattan Beach, Calif. OSborne 57131 - ORegon 80808

Daven Company, 530 W. Mt. Pleasant Ave., Livingston, N. J. WYman 2-4300

Davenport Mfg. Co., 2530-32 N. Elston Ave., Chicago 47, Ill. DIckens 2-5620

Davidson Optronics, Inc., 223 Ramona Blvd., West Covina, Calif. EDgewood 7-7281
(See advertisement on pages 122, 134)

Davies Brothers, Gladstone, N. J., PEapack 8-1290

Davis Instruments, 47 Halleck St., Newark 4, N. J. HUmboldt 2-3660
(See advertisement on page 39)

Detroit Representative
The Basic Service Corp.
16544 Plymouth Rd., Detroit, Mich.
VErmont 7-8820

Rep—Ga., Fla., E. Tenn., S. C., Ala.
Lewis M. Crowe Co.
111 Tuxedo Terrace, N.W., Atlanta 5, Ga.
CEdar 7-9209

Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3329

Rep—New York, New Jersey Area
George H. Birchall Co., Inc.
P. O. Box 84, Westfield, N. J.
ADams 2-3600

Texas-Louisiana Representative
Industrial Scientific, Inc.
2920 Shotts St., Ft. Worth 1, Tex. ED-6-2518
317 Nagle St., Houston 1, Tex. CA-8-0876
27th & Westover, Odessa, Tex. FE-28531
4543 North Blvd., Baton Rouge, La. DI-8-3616

Daystrom Instrument, Archbald, Pa. Jermyn, Pa. 1100

Daystrom Transicoil Corp., Worcester, Penna.
Dallas Representative
Allied Components Inc.
2517 Converse St., Dallas 7, Texas
RIverside 2-2830

Daytronic Corp., 216 S. Main St., Dayton 2, Ohio. BAldwin 3-7618

Dearborn Glass Co., 6600 S. Harlem Ave., Bedford Park, Ill. LU 5-0900

Decker Corp., 45 Monument Rd., Bala-Cynwyd, Penna. MOhawk 4-7010

Defender Instrument & Regulator Co., Boody, Ill. ELwin 2519

DeJur-Amsco Corp., Industrial Sales Div., 45-01 Northern Blvd., Long Island City 1, N. Y. RAvenswood 1-4009

Dekoron Products Div., (see Samuel Moore & Co.)

Del Electronics Corp., 521 Homestead Ave., Mt. Vernon, N. Y. OWens 9-3232

Delco Radio Div., General Motors Corp., 700 E. Firmin, Kokomo, Ind. GLadstone 2-8211

Delta-f, Inc., 113 E. State St., Geneva, Ill. Telephone 5600

DeMornay-Bonardi, 780 So. Arroyo Parkway, Pasadena, Calif. SYcamore 2-4143
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Denison Engineering Div., American Brake Shoe Co., 1160 Dublin Road, Columbus 16, Ohio. HUdson 8-1191

Derbyshire, Inc., F. W., 157 High St., Waltham, Mass.
(See advertisement on page 191)

Designers for Industry, Inc., 4241 Fulton Pkwy., Cleveland 9, Ohio. SHadyside 9-0700

Designs for Tomorrow, Inc., 6425 Etzel Ave., St. Louis 33, Mo. PArkview 6-5222

Detecto Scales, Inc., 540 Park Ave., Brooklyn 5, N. Y. MA 4-6100

Detroit Coil Co., 2435 Hilton Rd., Ferndale 20, Mich. JOrdan 6-3950

Detroit Controls Div., American Standard Corp., 5900 Trumbull Ave., Detroit 8, Mich. TRinity 2-0300

Deutsch Company, 700 Avalon Blvd., Los Angeles 3, Calif. PLeasant 1-4131 - LUdlow 3-6421

Devco Engineering, Inc., Pier Lane West, Caldwell, N. J. CApital 6-0610

Devcon Corp., 400 Endicott St., Danvers, Mass. SP 4-1990, 1991

Development Engineering Co., Inc., 9 Cross St., Norwalk, Conn. VOlunteer 6-7720
(See advertisement on page 33)

DeZurik Corp., Sartell, Minn. BLackburn 1-0221
Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Dialight Corp., 60 Stewart Ave., Brooklyn 37, N. Y. HYacinth 7-7600
(See advertisement on page 80)

Dialtron Corp., 208 Harrison Place, Brooklyn 37, N. Y. HYacinth 7-7600

Diamond Antenna & Microwave Corp., 7 North Ave., Wakefield, Mass. CRystal 9-4659

Diamond Power Specialty Corp., Electronics Div., P. O. Box 415, Lancaster, Ohio. OLive 3-6540

Dian Laboratories, Inc., 611 Broadway, New York 12, N. Y. AL 4-6555

Di/An Controls, Inc., 40 Leon St., Boston 15 Mass. HIghlands 5-5640

Dice Company, J. W., 16 Highwood Ave., Englewood, N. J. LOwell 9-0471
(See advertisement on page 138)

Dickson Company, 7420 Woodlawn Ave., Chicago 19, Ill. PLaza 2-0089

California Representative
Carkeek Engineering Co.
285 S. Euclid Ave., Pasadena, Calif.
MUrray 1-0489

Diehl Manufacturing Co., Sub. of The Singer Mfg. Co., 1116 Finderne Ave., Somerville, N. J. RAndolph 5-2200

MILITARY PRODUCTS DEPARTMENT
District Offices

CHICAGO 7, ILL.
1019 West Jackson Boulevard
TAylor 9-4556

CLEVELAND 14, OHIO
2117 Superior Avenue
MAin 1-4852

NEEDHAM HEIGHTS 94, MASS.
360 First Avenue
HIllcrest 4-4880

WASHINGTON 6, D. C.
1707 H Street, N.W.
District 7-3426

Representatives

ATLANTA 9, GA.
Scientific Sales Engrg. Co.,
2162 Piedmont Rd., N.E. TRinity 5-7291

DALLAS 35, TEX.
Air Equipment Sales Co.,
P.O. Box 35012, Inwood Rd., FLeetwood 2-6943

DENVER 22, COLO.
Spicer-Lindsay Associates,
4690 E. Evans Ave. SKyline 6-0627

PASADENA, CALIF.
Luscombe Engineering Co.,
1129 S. Fair Oaks Ave., RYan 1-5556

SCARBOROUGH, ONT.
Douglas Randall (Canada) Ltd.,
126 Manville Rd., PLymouth 9-2291

ST. PETERSBURG, FLA.
Scientific Sales Engineering Co.,
918 Snell Isle Blvd., St. Petersburg 5-7874

SAN MATEO, CALIF.
Luscombe Engineering Co., 130 N. "B" St.

Dietert Co., Harry W., 9330 Roselawn Ave., Detroit 4, Mich. WEbster 3-9790

Dietz Design & Mfg. Co., 12921 Fifth St., Grandview 17, Mo. SOuth 1-7216

Dietz Co., Inc., Henry G., 12-16 Astoria Blvd., Long Island City 2, N. Y. RAvenswood 6-3347

Diffraction Prod. Inc., 1400 So. 14th Ave., Maywood, Ill. FI 3-1546

Digitran Co., 45 W. Union St., Pasadena, Calif. RYan 1-9667

Digitronics Corp., Albertson Ave., Albertsen, L. I., N. Y. PIoneer 7-5090

Dillon & Co., W. C., Inc., 14620 Keswick St., Van Nuys, Calif. STate 5-3168
(See advertisement on page 139)

Detroit Representative
The Basic Service Corp.
16544 Plymouth Rd., Detroit, Mich.
VErmont 7-8820

New Jersey Representative
The Truesdell Company
No. 7 Spring St., Princeton, N. J.
WAlnut 1-8779

Dimes-Gray Co., 207 E. 6th St., Dayton 2, Ohio. BAldwin 2-6708
(See advertisement on page 203)

Dise Instruments Inc., 12671 Bubbling Well Road, Santa Ana, California. Lincoln 4-0210
(See advertisement on page 203)

Dit-Mco Inc., Electronics Div., 911 Broadway, Kansas City 5, Mo. HArrison 1-8484

Dixon Inc., William, 32-42 E. Kinney St., Newark 1, N. J.
(See advertisement on page 194)

DJECO Div. of Djordjevic Engineering Co., 1933 N. Damen, Chicago 47, Ill. ARmitage 6-7308

Dmeter Mfg. Co., Inc., 22-24 Larkin Plaza, Yonkers, N. Y. YOnkers 9-1770

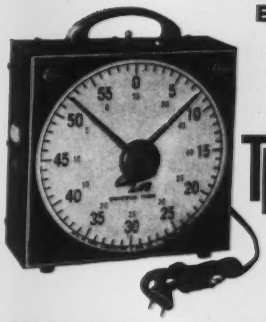
Dolinko & Wilkens, Inc., 1907 Summit Ave., Union City, N. J. UNion 7-6630

Donner Scientific Co., 888 Galindo St., Concord, Calif. MUlberry 2-6161

Dorne and Margolin, Inc., 29 New York Ave., Westbury, L. I., N. Y. EDgewood 4-3200

Douglas Radio Labs., 176 Norfolk Ave., Boston 19, Mass.

Dragon Engineering Co., Inc., P. O. Box 185, Norwalk, Calif. UNiversity 8-5224
(See advertisement on page 74)



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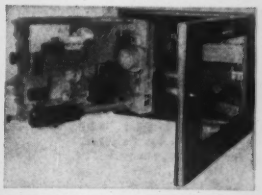

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New Jersey Representative
The Truesdell Company
No. 7 Spring St., Princeton, N. J.
WAlnut 1-8779

Drake Mfg. Co., 4626 No. Olcott, Harwood Heights, Chicago 31, Ill. UN 7-7227
(See advertisement on page 172)

Dressen-Barnes Corp., 250 No. Vinedo Ave., Pasadena, Calif. SYcamore 5-7731

Driver Co., Wilbur B., 1875 McCarter Highway, Newark 4, N. J. HUmboldt 2-5550

Dryomatic Corp., 806 N. Fairfax St., Alexandria, Va. KIng 9-3060

Ducommun Co., M., Dept. IN, 580 Fifth Ave., New York 36, N. Y. PLaza 7-2540
(See advertisement on page 203)

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DuKane Corp., St. Charles, Ill. Telephone 2300

DuMont Labs., Inc., Allen B., 750 Bloomfield Ave., Clifton, N. J. PIlescott 3-2000

Dunn Engineering Associates, Inc., 225 O'Brien Highway, Cambridge 41, Mass. UNiversity 4-6700

Duralcol, Inc., 1010 North Main St., Elkhart, Ind.

Duralab Equipment Corp., 979 Linwood St., Brooklyn 8, N. Y. NI 9-0581

Durant Mfg. Co., 1914 N. Buffum St., Milwaukee 1, Wis. LOcust 2-5035

Dwyer Mfg. Co., F. W., P. O. Box 373, Michigan City, Ind. TRiangle 2-4232, SE-3-7883
(See advertisement on page 54)

Dymec, Inc., 395 Page Mill Rd., Palo Alto, Calif. DA 6-1755

Dyna-Empire, Inc., 1075 Stewart Ave., Garden City, N. Y. Pioneer 1-2700
(See advertisement on page 106)

REPRESENTATIVES

Van Nuys, California
Tise Kennematt Co. (Mr. Kenneth Cox)
P. O. Box 2007, 14627 Bessemer St.
STanley 3-2427

Aurora, Illinois
Dwight Smith & Associates (Mr. Dwight Smith)
9 South River St., TWinoaks 7-5752

Dallas, Texas
Southwestern Engrg. Equipt. Co. (Mr. Fred Harmon)
3906 Lemmon Ave., LOgan 7433

Dynamatic Div., Eaton Mfg. Co., 3122 14th Ave., Kenosha, Wis. OL 7-6171

Dynametrics Corp., Northwest Industrial Park, Burlington, Mass. BRowning 2-1600
(See advertisement on page 45)

Dynamic Gear Co., Inc., 20 Merrick Rd., Amityville, L. I., N. Y. AM 4-4788

Dynamic Instrument Co., Inc., 42 Carleton St., Cambridge 42, Mass. UN 4-7260
(See advertisement on page 49)

Rep—E. Pa., S. N. J., Dela., Md., D. C., Va.
Polymetric Devices Co., Inc.
P. O. Box 236, Glenside, Pa. TU-7-4873
P. O. Box 246, Silver Spring, Md.

Dynamic Instrument Corp., 59 New York Ave., Westbury, L. I., N. Y. EDgewood 3-1600

Dynamics Instrumentation Co., Div. of Alberhill Corp., 1118 Mission St., So. Pasadena, Calif. RYan 13318

Dynamics Research Corp., 44 Winn St., Woburn, Mass. WEIls 3-7100
(See advertisement on page 152)

Dynapar Corp., 5150 Church St., Skokie, Ill. ORchard 4-6655

Dynatronics, Inc., 717 W. Amelia Ave., Orlando, Fla. GA 3-8691

Dyneers, P. O. Box 58, Chatham, N. J.

E

EMP Electronics Research Laboratories, Inc., 3131 No. 29th Ave., Phoenix, Ariz. ALpine 8-2462

ESC Corp., 534 Bergen Blvd., Palisades Park, N. J. WIndsor 7-0400

E-T-A Products Co. of America, 6284 No. Cicero Ave., Chicago 46, Ill. KIldare 5-1554

E & W Optical Co., 2406 E. Hennepin, Minneapolis 13, Minn. FR 1-9864

Eagle Signal Co., Div. The Gamewell Co., 202 20th St., Moline, Ill. Moline 2-5571

Eastern Air Devices, Inc., 385 Central Ave., Dover, N. H.

Eastern Industries, Inc., 100 Skiff St., Hamden 14, Conn. CH 8-3841

Eastern Reproductions Corp., 1250 Main St., Waltham 54, Mass. TW 3-0555 -6 -7

Eastern Specialty Co., 3617-19 No. 8th St., Philadelphia 40, Pa. BAldwin 8-0500

Eastman Kodak Co., 343 State St., Rochester 4, N. Y. LO 2-6000

Eberline Instrument Corp., 805 Early, Santa Fe, N. Mex. YUcca 21881

Ebert Electronics Corp., 212-26 Jamaica Ave., Queens Village 28, N. Y. SPruce 6-1800
(See advertisement on page 177)

EBEX, 1015 Atkin Ave., Salt Lake City 6, Utah

Eclipse Fuel Engineering Co., Rockford, Ill. WOodland 8-3751

Eder Engineering Co., Inc., 1568 S. 1st St., Milwaukee 4, Wis. EVergreen 3-3900

Eder Instrument Co. Inc., 2293 N. Clybourn Ave., Chicago 14, Ill. EAstgate 7-2131
(See advertisement on page 135)

Edison Industries, T. A., Instrument Div., Mc-Graw Edison Co., 24 Lakeside Ave., W. Orange, N. J. ORange 3-6800

Editape Company, 32 Central Parkway, Huntington, L. I., N. Y. HAmilton 1-0929

Edmund Scientific Co., 101 E. Gloucester Pk., Barrington, N. J. LIncoln 7-3488

Ednalite Optical Co., Inc., 200 N. Water St., Peekskill, N. Y. PE-7-4100

Edward Valves, Inc., Sub. of Rockwell Mfg. Co., 1200 W. 145th St., East Chicago, Ind. EXport 7-3231

Edwards Co., Inc., 90 Connecticut Ave., Norwalk, Conn. TEmple 8-8441

Eicor Div. of The Scranton Corp., 4059 W. North Ave., Chicago 39, Ill. HUmbolt 6-2060

Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif. LYtell 1-1451

El Products Corp., P. O. Box 41, New York 63, N. Y. KI-8-3948
(See advertisement on page 205)

Elco Corp., "M" St. below Erie Ave., Philadelphia 24, Pa.

Elcor, Inc., 1225 W. Broad St., Falls Church, Va. JEfferson 2-8850

Electra Manufacturing Co., 4051 Broadway, Kansas City, Mo. WEstport 1-6864

Electric Auto-Lite Co., Champlain St., Toledo 1, Ohio. CHerry 3-3131

Electric Design & Mfg. Co., 8th & Jefferson, Burlington, Iowa. PLaza 2-7685

Electric Eye Equipment Co., 1938 E. Fairchild St., Danville, Ill. Telephone 6-6500

Electric Hotpack Co., Inc., Dept. 627, Cottman & Melrose Sts., Philadelphia 35, Pa. DE 3-1700

Electric Regulator Corp., Norwalk, Conn. VIctor 7-2401

Electric Tachometer Corp., 68th & Upland Sts., Philadelphia 42, Pa. SAratoga 6-7723

Electro Development Co., 14701 Keswick St., Van Nuys, Calif. STanley 3-1850
(See advertisement on page 193)

Electro Devices Inc., 580 Main St., Wilmington, Mass. PArkview 9-2851

Electro Devices, Inc., 4648 Easton Ave., St. Louis 13, Mo. JEfferson 1-2075

Electro Instruments, Inc., 3340 Aero Court, San Diego 11, Calif. BRowning 7-6590

Electro Precision Corp., P. O. Box 669, Arkadelphia, Ark. CHapel 6-2272

Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago 40, Ill. LOngbeach 1-1707

Electro-Autosizing Machine Corp., 7 William St., Closter, N. J. CLoster 5-5540

Electrodata Div., Burroughs Corp., 460 Sierra Madre Villa, Pasadena, Calif. RYan 1-0471

Electrol, Inc., Dept. 9, 9000 West Pico Blvd., Los Angeles 35, Calif. BRadshaw 2-6010
(See advertisement on page 81)

Electro-Measurements, Inc., 7524 S.W. Macadam, Portland 19, Oregon. CHerry 6-3332

Electro-Mec Laboratory, Inc., 47-51 33rd St., Long Island City 1, N. Y. STillwell 6-3402
(See advertisement on page 80)

Electro-Mechanical Research, Inc., P. O. Box 3041, Sarasota, Fla. RIngling 6-1148

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Electro-Mechano Co., 261 Erie St., Milwaukee 2, Wis.
(See advertisement on page 204)

Electro-Medical Laboratory, Inc., So. Woodstock 7, Vt. WOodstock 144-M-4
(See advertisement on page 140)

Electro-Miniatures Corp., 610 Huyler St., So. Hackensack, N. J. HUbbard 9-7770

Electro Switch Corp., Weymouth 88, Massachusetts
(See advertisement on page 181)

Electron Arc Inc., 244 Broad St., Lynn, Mass.

Electronic Applications, Inc., 194 Richmond Hill Ave., Stamford, Conn. DA 5-1574

Electronic Associates, Inc., Long Branch, N. J. CApital 9-1100

Electronic Computer Co., 618 Maple St., Conshohocken, Pa. TAylor 8-3967

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Electronic Fabricators, Inc., 682 Broadway, New York 12, N. Y. SPringhill 7-4900

Electronic Heat Treating & Mfg., Inc., 181 North Getty, Muskegon, Mich.
(See advertisement on page 183)

Electronic Instrument Co., Inc., 33-00 Northern Blvd., Long Island City 1, N. Y. STillwell 6-8700

Electronic Measurements Co., Inc., Lewis St. & Maple Ave., Eatontown, N. J. LIberty 2-0300

Electronic Parts Mfg. Co., 508 -25th St., Union City, N. J. UN. 5-4028

Electronic Processes Corp. of Calif., 436 Bryant St., San Francisco 7, Calif. EXbrook 7-3881

Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa. CHestnut Hill 7-6800

Electronics International Co., 145 W. Magnolia Blvd., Burbank, Calif. VI 9-2481

Electrons, Inc., 127 Sussex Ave., Newark 3, N. J. HU. 2-5977

Electrosnap Corp., 4218 W. Lake St., Chicago 24, Ill. VAnburen 6-3100

Electrosolids Corp., 13745 Saticoy St., Panorama City, Cal. STate 2-1410

Electrovert, Inc., 124 E. 40th St., New York 16, N. Y. OXford 7-8396

Elgin Metalformers Corp., 630 Congdon Ave., Elgin, Ill. SHerwood 1-13490

Elgin National Watch Co., Abrasives Div., 107 National St., Elgin, Ill. SHerwood 2-3300

Ellis Associates, 67 Lincoln Ave., Pelham, N. Y. PElham 8-3360
(See advertisement on page 137)

Ellison Draft Gage Co., 548 W. Monroe St., Chicago 6, Ill. RAndolph 6-2286

ELLISON REPRESENTATIVES

Carolinas
Applied Engineering Company
Greensboro, North Carolina
P.O. Box 506, Orangeburg, South Carolina

Florida
H. K. Wilson
2126—14th St., St. Petersburg, Fla.

Georgia
Spotswood Parker & Company
313 Techwood Dr., N. W., Atlanta Ga.

New Jersey—New York
Charles C. Phelps Company, Inc.
700 New Work Ave., Union City, N. J.
(NJ) Union City 7-9150 (NY) Barclay 7-1822

Ohio
McLean-Peterson Company
6809 Stewart Rd., Cincinnati 36, Ohio
Tweed 1-1570

Asmead-Danks Company
316 Marian Bldg., Cleveland 13, Ohio

Pittsburgh and Buffalo
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Texas
F. A. Newell
Delta Instrument Co.
1812 Montana Ave., El Paso, Texas

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WRITE FOR FURTHER DETAILS
EL PRODUCTS CORP.
P. O. Box 41 New York 63, N. Y.

CIRCLE 385 ON READER-SERVICE CARD

Emery Company, A. H., Pine St., New Canaan, Conn.
(See advertisement on page 43)

Empire State Laboratories, Inc., Bellmore Gear Div., 2608 Merrick Road, Bellmore N. Y. SUnset 5-4888
(See advertisement on page 166)

Engelhard Industries, Inc., 113 Astor St., Newark, N. J. BIgelow 3-0030

Engineered Electronics Co., 506 E. First St., Santa Ana, Calif. KImberly 7-5651

Engineered Magnetics, 13041 Cerise Ave., Hawthorne, Calif. OR-8-7607

Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill. HArrison 7-3223

Engler Instrument Co., 250 Culver Ave., Jersey City 5, N. J. HEnderson 4-6500

Entron, Inc., P. O. Box 287, Bladensburg, Md. APpleton 7-9585

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EPIC Inc.
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Digby 9-2470

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Energy Kontrols, Inc., 11 So. First St., Geneva, Ill. GEneva 7150

Epic, Inc., 154 Nassau St., New York 38, N. Y. Digby 9-2470
(See advertisement on page 205)

Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I. Viking 7-1020
(See advertisement on Inside Front Cover, page 178)

Epsco, Inc., 275 Massachusetts Ave., Cambridge, Mass.
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Erie Pacific, Div. of Erie Resistor Corp., 12932 S. Weber Way, Hawthorne, Calif. ORegon 8-5418

Erie Resistor Corp., 644 W. 12th St., Erie 6, Pa. GLendale 6-5892

Erlex Manufacturing Co., 1945 Grove Drive, Erie, Pa. Telephone 4-0133

Erwood Inc., 1770 W. Berteau Ave., Chicago 25, Ill. BI 8-0622

Essex Electronics, 550 Springfield Ave., Berkley Heights, N. J. CRestview 3-9300

Esterline-Angus Co., Dept. G, P. O. Box 596, Indianapolis 6, Ind. CHapel 4-3318
(See advertisement on page 106)

PRODUCT REPRESENTATIVES

Amarillo, Texas
C. B. Anderson Electric Co.
P.O. Box 1836. Drake 6-6443

Atlanta 19, Georgia
The Gearhart Company
The Gearhart Bldg. CEdar 3-4431

Birmingham 5, Alabama
The Gearhart Company
512 N. 18th St. ALpine 2-7419

Boston (Stoneham) 80, Mass.
L. S. Kirmes
P.O. Box 192. SToneham 6-1410

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The Robert F. Lamb Company
1807 Elmwood Ave. BEdford 3757

Calgary, Alberta, Canada
George M. Fraser, Ltd.
1028—39th Ave., N. W. AVenue 9-7897

Chicago 5, Illinois
Murphy & Dickey
537 S. Dearborn St. HArrison 7-7953

Cincinnati, Ohio
G. H. Armstrong Co.
P.O. Box 25, Station K. KIrby 1-3692

Cleveland 15, Ohio
The L. H. Waldrip Company
3030 Euclid Ave. EXpress 1-4242

Dallas 20, Texas
Kemp Engineering Company
P.O. Box 13251. FLeetwood 7-6663

Denver 2, Colorado
Montain States Machinery Company
1526 Blake St. CHerry 4-7421

Des Moines, Iowa
Deco Engineering Products
1112 Locust St. ATlantic 8-5721

Detroit 27, Michigan
E. B. Anderson Company
12810 Puritan Ave. UNiversity 2-7705

Houston 19, Texas
The Eads Company
P.O. Box 13071. JAckson 8-6667

Indianapolis 4, Indiana
C. D. Arnold
911 N. Pennsylvania St. MElrose 4-3811

Kansas City, Missouri
C. B. Fall Company
P.O. Box 9744, Hickman Mills. SOuth 1-6545

Knoxville, Tennessee
Bowditch & Company
P.O. Box 3145. Tel. 4-2513

Los Angeles 46, California
Brenner-Fiedler & Associates
7563 Melrose Ave. WEbster 3-3811

Milwaukee 12, Wisconsin
M. F. Jacobs Company
808 W. North Ave., Suite 402. LOcust 2-5630

Minneapolis 3, Minnesota
Pinkney & Hine
1925 Nicollet Ave. FEderal 8-0523

Montreal, Quebec, Canada
W. Hobson & Associates
1024 Notre Dame St., Lachine. MElrose 7-1231

New Orleans 25, Louisiana
Mid-South Sales Company
P.O. Box 13032. TUlane 4683

New York
T. A. Kenny
P.O. Box 266, Summit, N. J. CRestview 3-7090

Oklahoma City 1, Oklahoma
C. B. Anderson Electric Company
P.O. Box 761. VIctor 3-7718

Omaha 2, Nebraska
Deco Engineering Products
712 South 24th St. JAckson 4111

Philadelphia 2, Pennsylvania
Linn O. Morrow & Son
Schaff Building. LOcust 7-6431

Phoenix, Arizona
J. E. Redmond Supply Co.
P.O. Box 869. ALpine 4-8471

Pittsburgh 16, Pennsylvania
W. H. Bollinger
P.O. Box 8088. LOcust 1-2340

St. Louis, Missouri
C. B. Fall Company
317 N. 11th St., Room 1003. CHestnut 1-2433

Salt Lake City 10, Utah
C. H. Spencer & Company
P.O. Box 1054. Dial 6-8683

San Francisco, California
The T. R. Routh Co.
P.O. Box 1056, Burlingame. DIamond 2-4147

Seattle 99, Washington
Eicher & Company
5 W. Harrison St. ATwater 4-1811

Syracuse 14, New York
J. F. Wulfetange, Jr.
4505 E. Genesee St., DeWitt Br. GIbson 6-3330

Toronto 7, Ontario, Canada
George M. Fraser, Ltd.
1554 Yonge St. WAlnut 4-9492

Tulsa 3, Oklahoma
C. B. Anderson Electric Company
712 Oil Capitol Bldg. GIbson 7-1123

Washington, D. C.
The Hildenbrand Company
P.O. Box 1060, Fairfax, Va. CRescent 3-2334

Etching Co. of Calif., 1208 Howard St., San Francisco 3, Calif. MArket 1-7670

Ever Ready Thermometer Co., 116 Wooster St., New York 12, N. Y. CAnal 6-4595

Ewald Instruments, Route 7F, Kent, Conn. WAlker 7-3278

Exact Weight Scale Co., 551 East Town St., Columbus 15, Ohio. CA 4-6187

Exactel Instrument Co., 185 Evelyn Ave., Los Altos, Calif. YOrkshire 8-6558
(See advertisement on page 28)

Exline Engineering Co., 107 W. 2nd., Tulsa 3, Okla. GIbson 7-4481

F

FAE Instrument Corp., 42-61 Hunter St., Long Island City 1, N. Y. STillwell 6-4959

Fafnir Bearing Co., 37 Booth St., New Britain, Conn. BAldwin 5-5151

Fairchild Camera & Instrument Corp., Robbins Lane, Syosset, N. Y. WEIls 1-4500

Fairchild Controls Corp., Components Div., 225 Park Ave., Hicksville, L. I., N. Y. WEIls 8-5600

Fairfield Engineering Corp., 934 Hope St., Springdale, Conn. DA 5-1561

Falcon Alarm Co., Inc., 243 Broad St., Summit, N. J. CRestview 3-5640

Falstrom Company, Falstrom Court, Passaic, N. J. PR 7-0013
(See advertisement on page 186)

Farmer Electric Products Co., Inc., 2300 Washington St., Newton Lower Falls 62, Mass. DEcatur 2-8383
(See advertisement on page 58)

Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J. WIndsor 4-6300
Rep—Pittsburgh, Pa., Charleston, W. Va.
Fogleman Co., Inc.
3849 Willow Ave., Pittsburgh 34, Pa. LE-1-4005
510 "C" St., S. Charleston 3, W. Va. RI-4-8401

Fecker, J. W., Inc., 6592 Hamilton Ave., Pittsburgh 6, Pa. EMerson 1-7617

Federal Pacific Electric Co., 50 Paris St., Newark 1, N. J.
(See advertisement on page 89)

California
G. B. Miller Company
1550 No. Highland, P.O. Box 1471
Hollywood 28, California
Hollywood 2-1195

Canada
John S. Plewes Company
52 Humbercrest Blvd.
Toronto 9, Ontario, Canada
Roger 9-2051

District of Columbia
Commercial Engineering Company
1627 K Street N.W.
Washington 6, DC
National 8-9238

Iowa
Deco Engineering Products
1112 Locust Street
Des Moines 7, Iowa
Atlanta 8-5721

Missouri
The Gaines Company
435 Westport Road
Kansas City 11, Mo.
Westport 1-5734

Massachusetts
Pacent Welling Inc
20 Providence St., Boston, Mass
Hancock 6-2248

New York
Carse Electric Company
1044 Broadway
Albany, New York
62-5364

New York
E. J. Robinson Associates
546 Niagara Street

Federal Pacific Reps Cont'd on page 206

Federal Pacific Reps Contd. from page 205

Buffalo, New York
Summer-7350

New York
Pacent Engineering Corporation
300 Northern Blvd.
Great Neck, L.I., New York
Murray Hill 3-1586
Hunter 2-4678

New York
Kahant Associates
11 Park Place
New York 7, New York
Cortland 7-5326

New York
E. J. Robinson Associates
526 Robineau Road
Syracuse, New York
Granite 8-2241

North Carolina
J. L. Highsmith Company
3733 Monroe Road
Charlotte 5, N. C.
Franklin 7-2546

Pennsylvania
Pacent Engineering Corporation
119 East Butler Avenue
Ambler, Pennsylvania
Mitchell 6-0405

Washington
J. C. McDougall
520 First Avenue, So.
Seattle 4, Washington
Main 7667

Federal Screw Products Inc., 3917 N. Kedzie Ave., Chicago 18, Ill. IRving 8-5744
(See advertisement on page 196)

Federal Shock Mount Corp., Div. of Korfund Co., Inc., 1060 Washington Ave., New York 56, N. Y. WY 3-0400

Feedback Controls, Inc., 899 Main St., Waltham 54, Mass. TWinbrook 4-1020

Feiler Engrg. & Mfg. Co., 8026 No. Monticello, Skokie, Ill. COrnelia 7-8280

Fellows Gear Shaper Co., 78 River St., Springfield, Vt. TUrner 5-2131

Femco, Inc., P. O. Box 32, Irwin, Pa. UNderhill 3-3200

Fenwal Inc., Pleasant St., Ashland, Mass. TRinity 5-6111

Ferguson Company, 814 Ridgely St., Baltimore 30, Md. LExington 9-5202

Ferguson Hille & Assoc. Inc., 542 S. Dearborn St., Chicago 5, Ill. WA 2-1808

Ferranti Electric, Inc., 95 Madison Ave., Hempstead, N. Y. IVanhoe 3-8244

Film Capacitors, Inc., 3400 Park Ave., New York 56, N. Y. CYpress 2-5180

Filtors, Inc., 30 Sagamore Hill Drive, Port Washington, N. Y. Port Washington 7-8220

Dallas Representatives
Allied Components Inc.
2517 Converse St., Dallas 7, Texas
RIverside 2-2830

Fischer & Porter Co., 775 County Line Rd., Hatboro, Pa. OSborne 5-6000

Fisher Co., Inc., Oscar., P. O. Box 426, Newburgh, N. Y. NEwburgh 2-3900

Fisher Governor Co., Box 307, Marshalltown, Iowa. Telephone 3581
(See advertisement on pages 14, 15)

Representative—So. California Area
E. R. Jones & Company
2334 E. 8th St., Los Angeles 21, Calif.
MAdison 7-1867

North Carolina Representative
Fobt. E. Mason & Co.,
1726 Hutchison Ave., Charlotte, N. C.
FRanklin 5-5747

Fisher Scientific Co., 711 Forbes Ave., Pittsburgh 19, Pa. EXpress 1-1330

Fish-Schurman Corp., 70 Portman Road, New Rochelle, N. Y. NE 6-1300
(See advertisement on page 154)

Fleetwood Laboratories, Inc., 300 Victory Blvd., New Rochelle, N. Y. BEverly 5-0831

Flexaust Co., 100 Park Ave., New York 17, N. Y. ORegon 9-1300

Flexonics Corp., 1337 S. 3rd Ave., Maywood, Ill.

Flodar Corp., 16911 St. Clair Ave., Cleveland 10, Ohio IV-6-2200

Flow Corp., 85 Mystic St., Arlington 74, Mass. MIssion 8-3185

Flow Measurements Corp., 10506 Wheatley St., Kensington, Md. LO 4-0122

Fluke Mfg. Co., Inc., John., 1111 West Nickerson, Seattle 99, Wash.

Fox Valley Instrument Co., Route 1, Cheboygan, Mich. MAdison 7-5161

Foxboro Co., 38 Neponset Ave., Foxboro, Mass. CApitol 7-1260

Freed Transformer Co., Inc., 1718 Weirfield St., Brooklyn 27, N. Y. EVergreen 8-1300
(See advertisement on page 94)

Friden, Inc., 2350 Washington Ave., San Leandro, Calif.

Fuller Co., 124 Bridge St., Catasauqua, Pa. COngress 4-2841

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., P. O. Box 400, Knoxville 1, Tenn. Telephone 4-1641
(See advertisement on page 64)

Furnas Electric Co., 1000 McKee St., Batavia, Ill. BAtavia 3410

G

GPE Controls, Inc., 240 E. Ontario St., Chicago 11, Ill. WHitehall 4-3700

BIRMINGHAM 9, ALABAMA
McConnell Sales & Engineering Corp.
P.O. Box 5708—Homewood Branch
1661-28th Ave. S. TRemont 1-3501

BUFFALO, NEW YORK
GPE Controls, Inc., (R. E. Tuwalski)
Room 808—The Rand Building
14 Lafayette Square. MOhawk 9997

BURBANK, CALIFORNIA
GPE Controls, Inc.
40 East Verdugo Ave. THornwall 5-1784

CHICAGO 11, ILLINOIS
GPE Controls, Inc. (F. J. Markey)
240 East Ontario St. WHitehall 4-3700

CINCINNATI 15, OHIO
Harry T. Porter Company
Box 246—Lockland Branch. VAlley 1-4346

CLEVELAND 15, OHIO
GPE Controls, Inc. (T. W. Lasiewicz)
Room 425—Union Building
1836 Euclid Ave. CHerry 1-1633

DALLAS 6, TEXAS
Wright Industrial Products Co.
5738 N. Central Expressway. TAylor 4-2571

DENVER 16, COLORADO
Howard Peterson Company
4949 Colorado Blvd. DExter 3-5434

DETROIT 35, MICHIGAN
GPE Controls, Inc. (William S. Hultz)
20131 James Couzens Hwy. VErmont 8-8683

GREENVILLE, SOUTH CAROLINA
Marshall & Williams Equipment Co.
(Textile Industry Only)
Box 5255—Sta. B. CEdar 2-7338

HOUSTON 19, TEXAS
The Eads Company
Box 13071, 1115 Dunlavy St. JAckson 6-1646-7

KANSAS CITY 12, MISSOURI
W. C. Carolan Company
612 West 47th St. JEfferson 1-5505

KENNER, LOUISIANA
E. C. Deshautreaux, Jr.
P.O. Box 261. KEnner (21) 4-4665

LOS ANGELES 22, CALIFORNIA
Bojanower Machinery Service Co.
(Edge position control activity only exclusive of primary steel plants)
5270 E. Washington Blvd. ANgelus 3-6175

NEW YORK, NEW YORK
GPE Controls, Inc. (T. G. Watkins)
175 Market St., Paterson 1, N. J. LAmbert 5-0561

PITTSBURGH 22, PENNSYLVANIA
GPE Controls, Inc. (E. R. Engstrom)
618 Bessemer Bldg., 104-6th St. GRant 1-7085

SALT LAKE CITY 1, UTAH
Specialty Sales Company
117 West 2nd South St. DAvis 2-5553

CANADA
Process-Instrument Systems, Ltd.
44 Haas Road, Toronto (Rexdale P.O.) Ont.
CHerry 1-4401

GPS Instrument Co., Inc., 180 Needham St., Newton 64, Mass. DEcatur 2-3110

G. S. Equipment Co., 15585 Brookpark Rd., Cleveland 35, Ohio. CLearwater 2-4770
(See advertisement on page 33)

G-V Controls Inc., Okner Parkway, Livingston, N. J. WYman 2-8200

Gaertner Scientific Corp., 1208 Wrightwood Ave., Chicago 14, Ill.

Gallien & Son, R. P., 220 West Fifth St., Los Angeles 13, Calif.
(See advertisement on page 157)

Gamewell Company, 1238 Chestnut St., Newton Upper Falls 64, Mass. BIgelow 4-1240

Gap Instrument Corp., 116 E. Merrick Rd., Freeport, L. I., N. Y. FReeport 8-1040

Garde Mfg. Co., 53 John St., Cumberland, R. I. Pawtucket 6-4200

Garlock Packing Co., 402 Main St., Palmyra, N. Y.

Garlynn Engineering Co., 755 Pennsylvania Ave., San Francisco 7, Calif. MIssion 7-2113

Gas Drying, Inc., Box 56, Summit, N. J. CRestview 3-0633

Gates & Co., Geo. W., Hempstead Tpke. & Lucille Ave., Franklin Square, L. I., N. Y. FIeldstone 7-0737, -8, -9

Gates Electronic Co., 2090 Barnes Ave., Bronx 60, N. Y. TYrone 2-6490

Gatti, Inc., Aurele M., 527 Tindall Ave., Trenton 9, N. J. EXport 6-1577

Gaynes Engineering Co., 1642 W. Fulton St., Chicago 12, Ill. HA 1-5257

Geier & Bluhm, Inc., 594 River St., Troy, N. Y. AShley 2-6951
(See advertisement on page 141)

Gelber & Sons, S., Inc., 5806 N. Lincoln Ave., Chicago 45, Ill. LO 1-3787

Gelman Instrument Co., 106 N. Main St., Chelsea, Mich. GReenwood 9-4821
(See advertisement on page 120)

Gems Co., Inc., 85 Market Sq., Newington, Conn.
California Representative
Carkeek Engineering Co.
285 S. Euclid Ave., Pasadena, Calif.
MUrray 1-0489

General Automatic Corp., 12 Carlton Ave., Mountain View, N. Y. CL 6-2756

General Cement Mfg. Co., Div. of Textron Inc., 400 So. Wyman St., Rockford, Ill. WOodland 8-9661

General Controls Co., 801 Allen Ave., Glendale 1, Calif. Victoria 9-2181
(See advertisement on Back Cover)

General Controls Co., PIC Automation Controls Div., 8080 McCormick Blvd., Skokie, Ill.
Detroit Representative
The Basic Service Corp.
16544 Plymouth Rd., Detroit, Mich.
VErmont 7-5320

General Devices, Inc., P. O. Box 253, Princeton, N. J. DA 9-2323
Massachusetts Representative
George J. Neuman & Co.
104 Pilgrim Rd., Wellesley 81, Mass.
CEdar 5-5353

General Electric (GE) Co., Apparatus Sales Div., 1 River Road, Schenectady 5, N. Y. FRanklin 4-2211
(See advertisement on pages 59, 109, 132, 163)

General Electric (GE) Co., Capacitor Department, Irmo, S. C.
Authorized Factory Source
Schwebar Electronics
60 Herricks Rd., Mineola, L. I., N. Y.
PIoneer 6-6520

General Electric (GE) Co., Computer Dept., Deer Valley Park, Phoenix, Ariz.

General Electric (GE) Co., Heavy Military Electronics Dept., Court Street Plant, Syracuse, N. Y. GRanite 6-4411

General Electric (GE) Co., Magnetic Materials Section, Edmore, Mich. HA-7-5151

General Electric (GE) Co., Missile & Space Vehicle Dept., Lakeside Ave., Burlington, Vt. UNiversity 3-3411

General Electric (GE) Co., Power Tube Dept., 1 River Road, Bldg. 267, Schenectady 5, N. Y. FRanklin 4-2211

General Electric (GE) Co., Semiconductor Products Dept., 1224 W. Genessee St., Syracuse, N. Y.

General Electric (GE) Co., Specialty Controls Dept., Waynesboro, Va.
Authorized Factory Source
Schwebar Electronics
60 Herricks Rd., Mineola, L. I., N. Y.
PIoneer 6-6520

General Electric (GE) Co., Voltage Regulator Product Section, 100 Woodlawn Ave., Pittsfield, Mass.

General Electric (GE) Co., X-Ray Dept., 4855 Electric Ave., Milwaukee 1, Wis. EVergreen 3-3211

General Electrodynamics Corp., 4430 Forest Lane, Garland, Texas. BRoadway 6-1161

General Industries Co., Olive and Taylor Sts., Elyria, O. FAirfax 3-3136

General Magnetics, Inc., 135 Bloomfield Ave., Bloomfield, N. J. PI 8-2400

General Motors, Inc., 424 South 7th St., P. O. Box 1701, Grand Junction, Colo.
(See advertisement on page 93)

General Mills, Inc., Mechanical Div., 1620 Central Ave. N.E., Minneapolis 13, Minn. STerling 9-8811

General Photo Prods. Co., Inc., P. O. Box 23, Chatham, N. J. MErcury 5-5200

General Precision Laboratory, Inc., 63 Bedford Road, Pleasantville, N. Y. ROgers 9-5000

General Radio Co., West Concord, Mass. EMerson 9-4400
(See advertisement on page 91)

General Railway Signal Co., P. O. Box 600, Rochester 2, N. Y. IDlewood 6 3020

General Regulator Corp., 666 5th Ave., New York 19, N. Y. JU 2-8600

General Resistance, Inc., 577 E. 156th St., Bronx 55, N. Y. CY-2-1500

General Time Central Research Laboratory, 107 Lafayette St., N. Y. 13, N. Y. WOrth 6-0822
(See advertisement on page 78)

General Transistor Corp., 91-27 138th Place, Jamaica 35, N. Y. HI 1-1000

Genesys Corp., 10131 National Blvd., Los Angeles 34, Calif. TExas 0-2777

Genisco, Inc., 2233 Federal Ave., Los Angeles 64, Calif. BRadshaw 2-2706

Genisco Instrument Div., Genisco, Inc., 2209 Barry Ave., Los Angeles 64, Calif. GR 9-4331 Ext. 66

Geotechnical Corp., 3401 Shiloh Road, Garland, Texas. BRoadway 8-8102
(See advertisement on page 131)

Gerber Scientific Instrument Co., 89 Spruce St., Hartford 1, Conn. JAckson 8-2124

Giannini Controls Corp., 918 E. Green St., Pasadena, Calif. MUrray 1-7152

Gibson Electric Co., Box 540, Delmont, Pa. HOward 8-7701

Gilmore Industries, 13015 Woodland Ave., Cleveland 20, Ohio. RA 1-6400

Gisholt Machine Co., 1331 East Washington Ave., Madison 10, Wis. ALpine 6-9081

Gleason Works, 1000 University Ave., Rochester 3, N. Y. GReenfield 3-1000

Globe Electrical Mfg. Co., 1729-45 W. 134th St., Gardena, Calif. FAculty 1-3311

Globe Industries, Inc., 1784 Stanley Ave., Dayton 4, Ohio. BA 2-3741

Golden Anderson Valve Specialty Co., Inc., 1232 Ridge Ave., Pittsburgh 33, Pa. FAirfax 2-8130
(See advertisement on page 72)

Gombos Co., John, Webro Road, Clifton, N. J. PRescott 3-6633

Gordon Co., Claud S., 3000 S. Wallace St., Chicago 16, Ill. VIctory 2-6525
St. Louis Representative
Fillo Sales & Engineering Co.
4401 Chouteau Ave., St. Louis, Mo.
JEfferson 1-0477

Gordon Enterprises, 5362 No. Cahuenga Blvd., No. Hollywood, Calif. POplar 6-3725

Gordos Corp., 250 Glenwood Ave., Bloomfield, N. J. PIlgrim 3-6800

Gorham Mfg. Co., Electronics Div., 333 Adelaide Ave., Providence 7, R. I. Williams 1-1000

Gorn Electric Co., Dept. IA, 845 Main St., Stamford, Conn. FIreside 8-7591

Gorton Machine Co., Geo., 1126 W. 13th St., Racine, Wis. MElrose 4-6644

Goslin Electric & Mfg. Co., 2921 W. Olive Ave., Burbank, Calif. THornwall 8-0776

Gould Co., J. D., 4707 Massachusetts Ave., Indianapolis 18, Ind. LIberty 7-5389

Gow-Mac Instrument Co., 100 Kings Road, Madison 1, N. J. FRontier 7-3450
(See advertisement on page 120)

Graf-Apsco Co., 5868 Broadway, Chicago 40, Ill. LOngbeach 1-6085

Graham Transmissions, Inc., Menomonee Falls, Wis. MEnomonee Falls 3600

Grain Laboratory Equip., Inc., Longlake, Minn. GR 3-8400

Grant Pulley & Hardware Corp., High St., West Nyack, N. Y. NYack 9-4400

Granville-Phillips Co., P. O. Box 191, Pullman, Wash. LOgan 41130

Graphic Controls Corporation, Buffalo 10, New York
(See advertisement on page 146)

Graphik-Circuits Div., Cinch Mfg. Co., 200 So. Turnbull Canyon Road, City of Industry, Calif. EDgewood 3-1201

Graphite Metallizing Corp., 1096 Nepperhan Ave., Yonkers, N. Y. YOnkers 8-8400

Gray Instrument Co., 448 Mill Rd., Andalusia, Pa. HO 4-2100
(See advertisement on pages 96, 172)

Grayhill Inc., 561 Hillgrove Ave., LaGrange, Ill. FLeetwood 4-1040

Green Instrument Co., Inc., 385 Putnam Ave., Cambridge 39, Mass. ELiot 4-2989
(See advertisement on page 191)

Green Instruments, Henry J., Inc., 2501 Shames Drive, Westbury, N. Y. EDgewood 3-5888

Green Rectifier Co., 1-10 30th St., Fairlawn, N. J. SWarthmore 7-8100

Greibach Instruments Corp., 315 North Ave., New Rochelle, N. Y. New Rochelle 3-7900

Greiner Co., Emil, 20 N. Moore St., New York 13, N. Y. WO-6-4700

Griebel Co., E., P. O. Box 354, Carbondale, Pa. Telephone 153

Gries Reproducer Corp., 130 Beechwood St., New Rochelle, N. Y. NE 3-8600

Grinnell Co., 277 West Exchange St., Providence 1, R. I. TEmple 1-7000

Grove Valve & Regulator Co., 6529 Hollis St., Oakland 8, Calif. OL 5-7700
(See advertisement on page 51)

Gubelman Charts, Inc., 100-106 E. Kinney St., Newark 5, N. J. Mitchell 2-5970
(See advertisement on page 157)

Gudeman Co., 340 W. Huron St., Chicago 10, Ill. DElaware 7-7400

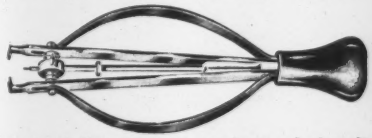
Gulton Industries, Inc., 212 Durham Ave., Metuchen, N. J. LIberty 8-8200

Gump Co., B. F., 1325 S. Cicero Ave., Chicago 50, Ill. BI 2-3050

Gurley, W. & L. E., 1900 Fifth Ave., Troy, N. Y. AShley 2-6300

Gustafson Mfg. Co., G. D., 29 E. Madison St., #1409 Chicago 2, Ill. STate 2-1341
(See advertisement on page 207)

Pull off hands and pointers more efficiently with our PRESTO HAND and POINTER PULLER



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CIRCLE 387 ON READER-SERVICE CARD

Guthery Machine Tool Corp., 38-31 Crescent St., Long Island City 1, New York
(See advertisement on page 192)

Gyrex Corp., 3003 Pennsylvania Ave., Santa Monica, Calif. EXbrook 30462

H

H-B Instrument Co., American & Bristol Sts., Philadelphia 40, Pa. DA 9-9125

H & H Machine Co., Inc., Noble & Jackson St., Norristown, Pa. BRoadway 2-6453

H. J. J. Company, 268 Marlow Drive, Oakland 5, Calif. LOakhaven 2-1603
(See advertisement on page 193)

Hagan Chemicals & Controls, Inc., Hagan Bldg., Pittsburgh 30, Pa. WAlnut 2-3737
(See advertisement on pages 30, 31, 32, 38, 46, 50, 57, 63, 79, 96, 162)

Haledy Electronics Co., 57 William St., New York 5, N. Y. WHitehall 3-8140

Hallikainen Instruments, 1341-7th St., Berkeley 10, Calif. LAndscape 4-1757

Haloid-Zerox, Inc., 57-198X Haloid St., Rochester 3, N. Y.

Hamilton Tool Co., 9th St. at Hanover, Hamilton, Ohio TWinbrook 5-4351

Hamilton Watch Co., Industrial Div., Columbia Ave., Lancaster, Pa. EXpress 4-7161

Hamlin, Inc., 1316 Sherman Ave., Evanston, Ill. Greenleaf 5-8244

Hammel-Dahl Div., General Controls Co., Warwick Industrial Park, Warwick, R. I. STuart 1-6200

Hamner Electronics Co., Inc., P.O. Box 531, Princeton, N. J. Pennington 7-1320

Handicraft Tools, Inc., Div. of X-Acto, Inc., 48-41 Van Dam St., Long Island City 1, N. Y. EXeter 2-3333

Handy & Harman, 82 Fulton St., New York 38, N. Y.

Hankison Corp., Dept. CI, College & Pike, Canonsburg, Pa. LOcust 3-3337
(See advertisement on page 30)

Hansen Co., Wm., 165 Silverbrook Ave., Niles, Mich.

Hanson-Gorrill-Brian, Inc., 85 Hazel St., Glen Cove, N. Y. Oriole 6-7300

Harco Laboratories, Inc., 77 Olive, New Haven 7, Conn. STate 7-6701

Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J. MArket 2-8200

Harris Refrigeration Co., 308 River St., Cambridge 39, Mass. UNiversity 4-4000

Harris Transducer Corp., Woodbury, Conn. COngress 3-2116

Hart Manufacturing Co., 220 Bartholomew Ave., Hartford 1, Conn. JAckson 5-3491

Hartford Steel Ball Co., Inc., 12 Jefferson Ave., West Hartford, Conn. AD-3-1251

Harvey-Wells Electronics, Inc. R&D Div., 5168 Washington St., West Roxbury 32, Mass. FAirview 7-8000

Haskris Co., 6720 N. Lincoln Ave., Lincolnwood, (Chicago 45), Ill. COrnelia 7-3211

Hasler-Tel. Co., Inc., 30 Vesey St., New York 7, N. Y. WOrth 2-2831
(See advertisement on page 61)

Hass Instrument Corp., 6173 Branch Ave., Washington, 23 D. C. HI 9-5454
(See advertisement on page 44)

Hassall, Inc., P. O. Box 2158, Westbury, Long Island, N. Y.
(See advertisement on page 195)

Hasting-Raydist, Inc., Newcomb Ave., Hampton, Va. PArk 3-6531
Rep—Pittsburgh, Pa., Charleston, W. Va.
Kurt J. Lesker Company
4535 Veman Ave., Pittsburgh 27, Pa.
TUxedo 1-4666

Philadelphia Area Representative
Tyler Griffin Company
32 S. Fairfield Rd., Devon, Penna.
MUrray 8-4821 and ENterprise 9-4821

Hathaway Instrument Div., Hamilton Watch Co., 5800 E. Jewell, Denver 22, Colo. SKyline 6-8301

Haveg Industries, Inc., 900 Greenbank Rd., Wilmington 8, Del. WYman 8-2271

Hawk Tool & Engrg. Co., Inc., Clarkston, Mich. MA 5-5381

Haydon Co., A. W., 228 No. Elm St., Waterbury 20, Conn. PLaza 6-4481
(See advertisement on page 26)

Haydon Div., General Time Corp., 245 E. Elm St., Torrington, Conn. HUnter 9-3158

Haydon Instrument Co., 165 W. Liberty St., Waterbury 20, Conn. PLaza 6-2211

Haydon Switch, Inc., 536 So. Leonard St., Waterbury 20, Conn. PLaza 6-7441

Hayes, Inc., C. I., 800 Wellington Ave., Cranston 10, R. I. HOpkins 1-3400

Hays Corp., Michigan City 39, Ind. TRiangle 2-5561

Hays Manufacturing Co., Automatic Controls Div., 801 W. 12th St., Erie, Pa. Telephone 2-3225

Healy-Ruff Co., 2255 University Ave., St. Paul 14, Minn. MIdway 6-2701

Heinze Electric Co., 685 Lawrence St., Lowell, Mass. GL 77556

Heise Bourdon Tube Co., Inc., Brook Road, Newtown, Conn. GArden 84406
(See advertisement on page 53)

Heitz, Inc., Karl, 480 Lexington Ave., New York 23, N. Y. YUkon 6-4920
(See advertisement on page 78)

Helicoid Gage Div., American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport 2, Conn. Edison 5-0161

Heller Co., Gerald K., 1819 Industrial Road, P.O. Box 4426, Las Vegas, Nev.

Henry Valve Co., 3215 North Ave., Melrose Park, Ill. FIlmore 4-1100

Henson Co., Fred C., 3311 E. Colorado Blvd., Pasadenna 8, Calif. SY-2-3311

Hermes Electronics Co., 75 Cambridge Parkway, Cambridge 42, Mass.
New England Representative
Instrument Dynamics, Inc.
11Aibion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Herron Optical Co., 9117, S. Main St., Los Angeles 3, Calif. PLymouth 4-2943

Hevi-Duty Electric Co., 2040 W. Wisconsin Ave., Milwaukee 1, Wis. WE 3-3339

Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif. DAvenport 5-4451

Hewson Co., Inc., 443 Broad St., Newark 2, N. J. HUmboldt 3-3000

Hexacon Electric Co., 161 W. Clay Ave., Roselle Park, N. J. Chestnut 5-6200

Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio. Liberty 1-8060
(See advertisement on page 107)

SALES REPRESENTATIVES

New England
Johnson Associates—CRystal 6-5500
404 Main St., Wakefield, Mass.

D. C., Virginia, Maryland
G. E. Wolfe—EXecutive 3-2692
Box 3812, Rosslyn Sta., Arlington 9, Va.

N. & S. Car., Tenn., Ga., Ala., Fla.
Hollingsworth & Still—MUrray 8-5878
508 Whitehead Bldg., Atlanta, Ga.
Hollingsworth & Still—GArden 5-6808
807 N. Summerlin St., Orlando, Fla.

Hollingsworth & Still—Plaza 7-9793
7290 N.E. 8th Ave., Miami, Fla.
Hollingsworth & Still—JAckson 3-2966
4837 Gilmore Dr., Charlotte, N. C.

N. Y. City, N. J., Eastern Penna.
K. E. Hughes Co.—UNion 7-3204
4808 Bergenline Ave., Union City, N. J.
K. E. Hughes Co.—EVergreen 6-3130
101 N. 33rd St., Philadelphia, Penna.
R. K. Arbogast—NOrth 4-5656
257 Ell Rd., Hillsdale, N. J.
Howard N. Jurnovoy—GReenwood 3-1417
5704 Malvern Ave., Philadelphia, Penna.

Upper N. Y. State, Erie, Penna.
R. W. Mitscher Co.—WAshington 2517
487 Ellicott Sq. Bldg., Buffalo 3, N. Y.
R. W. Mitscher Co.—GIbson 6-3164 (Syracuse)
51 Ely Dr., Fayetteville, N. Y.
R. W. Mitscher Co.—GLobe 4-8320
15 Thornwood Dr., Poughkeepsie, N. Y.
R. W. Mitscher Co.—HUbbard 7171 (Rochester)
786 Chestnut Bend, Webster, N. Y.

Ohio, Ky., W. Va., W. Pa., S. Ind.
James M. Landfear & Co.—FAirmont 1-4533
12429 Cedar Rd., Cleveland 6, Ohio
Fishman Associates—LIberty 6-5477
4440 N. Campbell Ave., Indianapolis 26, Ind.

Michigan, Northern Indiana
George Harbough—JUniper 8-0187
144 Wacon, Troy, Mich.

Mississippi, S. Louisiana
Earl K. Moore Co.—AUdubon 2407
5864 Louisville, New Orleans 24, La.

N. Dak., S. Dak., Wis., Minn., N. Iowa
Nick J. Laub Co.—JUniper 8-4663
3749 W. Broadway, Minneapolis 22, Minn.
Nick J. Laub Co.—DIvision 4-2200
2333 West Wells St., Milwaukee, Wis.

Northern Illinois, S. Wisconsin
L. C. McCarthy—KIldare 5-7976
7117 W. Addison St., Chicago 34, Ill.

Nebr., Kan., Mo., S. Iowa, S. Ill.
G. Kangas Sales Co.—TUxedo 8-5213
10506 W. 89th St., Overland Park, Kan.

Texas, Okla., Ark., N. La.
J. Earl Smith—FLeetwood 7-1727
Box 35331 Airlawn Sta., Dallas 35, Tex.
J. Earl Smith—MIssion 4-4621
5339 Keystone, Houston 21, Tex.

Wyo., Colo., Utah, New Mexico
Gordon Moss Electronics, Inc.—ELgin 3-1452
1530 13th Ave., P.O. Box 428, Greeley, Colo.
Gordon Moss Electronics, Inc.—GLendale 5-0268
5194 Perry St., Denver, Colo.

West Coast, Pacific Northwest
Branch Office—THornwall 5-1771
2585 Shattuck Ave., Berkeley 4, Calif.
Branch Office—Hollywood 7-7673
P.O. Box 1187, Hollywood 28, Calif.
Emery C. Boring—ALpine 3-9472
13128 S.E. Ash St., Portland 16, Ore.

Canada
Stark Electronic Sales—AJax 125
P.O. Box 670, Ajax, Ontario

Export
Hickok Export Dept.—MUrrayhill 3-2400
431 Fifth Ave., New York 16, N. Y.

Hawaii
Gene Piety Factors, Inc.—Phone 83-105
2030 Home Rule St., Honolulu, Hawaii

High Temperature Instruments Corp., 143 Bala Ave., Bala-Cynwyd, Pa. MOhawk 4-5985

Hill & Co., E. Vernon, P.O. Box 189, Lake Geneva, Wis. CHestnut 8-3729

Hillburn Electronic Prods. Co., 55 Nassau Ave., Brooklyn 22, N. Y. STag 2-3875

Hills-McCanna Co., 4595 W. Touhy Ave., Chicago 46, Ill. ORchard 4-7080

Hirschmann Co., Carl, Inc., 30 Park Ave., Manhasset, L. I., N. Y. MAnhasset 7-5300

Hitemp Wires, Inc., 1200 Shames Drive, Westbury, L. I., N. Y. ED 3-4600

Hobbs Corp., John W., Div. Stewart-Warner Corp., P.O. Box 358, Springfield, Ill. Telephone 8-7533

Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill. UNiversity 9-9850

Hoffman Laboratories Div., Hoffman Electronics Corp., 3740 So. Grand Ave., Los Angeles 7, Calif. RIchwood 7-4488

Hoke, Inc., 1 Tenakill Park, Cresskill, N. J. LOwell 8-9100
(See advertisement on page 48)

Rep—Pittsburgh, Pa., Charleston, W. Va.
Fogleman Co., Inc.
3849 Willow Ave., Pittsburgh 34, Pa. LE-1-4005
510 "C" St., S. Charleston 3, W. Va. RI-4-8401

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Holtzer-Cabot Div., National Pneumatic Co., Inc., 125 Amory St., Boston 19, Mass. JAmaica 4-7000

Hoover Electronics Co., 110 W. Timonium Rd., Timonium, Md. VAlley 5-5200

Houston Instrument Corp., 1717 Clay Ave., Houston 3, Tex. CApitol 5-6964
(See advertisement on page 115)

HOUSTON INSTRUMENT REPS.

CALIFORNIA, ARIZONA, NEVADA
McCarthy Associates, Inc.
1055 E. Walnut, Pasadena. MU-1-7411
3460 Ingraham, San Diego. BR-4-1100
Sacramento-Folsom: ENterprise 1-0879
635 Oak Grove, Menlo Park. DA-6-7937
111 W. Osborn Rd., Phoenix. CR-9-1891

N. C., S. C., SO. VA., TENN., ALA., GA.
J. L. Highsmith & Co.
3733 Monroe Rd., Charlotte, N. C.
FRanklin 7-2546

CANADA
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UNiversity 2-2571

NEW ENGLAND
J. M. Lancaster Company
7 Barker Lane, Saxonville, Mass.
TRinity 3-8893

OHIO
Elliott-Sarles Company
23473 Concord Dr., Westlake.
EDison 1-8911

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Q E D Electronic Sales, Inc.
9 Elm Ave., Mount Vernon, N. Y.
MOunt Vernon 8-3100

MD., D. C., DELAWARE & NO. VIRGINA
Thos. H. Closs Co.
21 W. Penna. Ave., Towson 4, Md.

Houston Magnetic Products, Inc. (Subsidiary of Houston Instr. Corp.), 1514 Foley St., Houston 24, Tex. HOmestead 8-2696
(See advertisement on page 86)

Hoyt Electrical Instrument Works, see Burton-Rogers Co.

Hub-Pot, Inc., 13827 Saticoy St., Van Nuys, Calif. STate 2-2300

Hufco Industries, 2815 W. Olive Ave., Burbank, Calif. VIctoria 9-2118

Hughes Products, International Airport Sta., Los Angeles 45, Calif. ORchard 0-1515

Humphrey, Inc., 2805 Canon St., San Diego 6, Calif. AC-31654

Humphrey Products Div., General Gas Light Co., 202 N. Park St., Kalamazoo, Mich. FI 2-0127

Hunter Spring Co., 1 Spring Ave., Lansdale, Pa. Ulysses 5-6815

Huppert Co., K. H., 6830-40 Cottage Grove, Chicago 37, Ill. MI 3-4770

Hurst Tool & Mfg. Co., Inc., Hwy 64 East, Princeton, Ind.

Hydraulic Controls Co., Inc., 217 California St., Newton 58, Mass. DEcatur 2-0066

Hydromatics Inc., 70 Okner Pkwy., Livingston, N. J. WYman 2-4900

Hydroway Scales, Inc., 31302 Stephenson Hwy., Madison Heights, Mich. JOrdon 6-3965

Hydel, Inc., 223 Crescent St., Waltham 54, Mass. TWinbrook 3-8200

I

IBM (International Business Machines Corp.), 590 Madison Ave., New York 22, N. Y. PLaza 3-1900

Ideal Industries, Inc., 1420 Park Ave., Sycamore, Ill. Telephone 2114

Ideal Precision Meter Co., Inc., 126 Greenpoint Ave., Brooklyn 22, N. Y. EV 3-6904

Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill. WHitehall 3-1331
(See advertisement on page 22)

Illumitronic Engineering Co., 680 E. Taylor Ave., Sunnyvale, Calif.
(See advertisement on page 194)

Impact-O-Graph Corp., 1900 Euclid Ave., Cleveland 15, Ohio CHerry 15838

Imperial Brass Manufacturing Co., 6300 W. Howard St., Chicago 48, Ill SPring 4-1700
(See advertisement on page 23)

Indiana Steel Products Co., 405 Elm St., Valparaiso, Ind. Telephone 2-5601
(See advertisement on page 167)

Induction Motors Corp., 570 Main St., Westbury, N. Y. EDgewood 4-7070

Induction Motors of Calif., Div. of Induction Motors Corp., 6058 Walker Ave., Maywood, Calif. LUdlow 3-4785
(See advertisement on page 78)

Industrial Engineering Corp., 525 E. Woodbine, Louisville 8, Ky. MElrose 4-3601
(See advertisement on page 52)

Industrial Instrument Corp., Drawer 777, Austin, Texas GLendale 3-7261

Industrial Instruments, Inc., 89 Commerce Rd., Cedar Grove, Essex County, N. J. CEnter 9-6200
(See advertisement on pages 30, 43, 95, 96, 101, 105, 126, 159)

Industrial Instruments Engineering Corp., 89 Commerce Rd., Cedar Grove, Essex County, N. J.
(See advertisement on pages 40, 158)

Industrial Measurements Corp., 250 N. Thomas St., Pomona, Calif. NAtional 3-1588

Industrial Nucleonics Corp., 650 Ackerman Rd., Columbus 14, Ohio. AMherst 7-6351

Industrial Rectifier Devices, Inc., 324 Lafayette St., New York 12, N. Y. WOrth 4-4960

Industrial Test Equipment Co., 55 E. 11th St., New York 3, N. Y. GRamercy 3-4684
(See advertisement on page 108)

Industrial Timer Corp., 1407 McCarter Highway, Newark 4, N. J. HU 4-5600

Industrial Transformer Corp., Gouldsboro, Pa. VIctor 22111

Industro Transistor Corp., 35-10-36th Ave., Long Island City 6, N. Y. EXeter 2-8000

Inertia Switch Inc., 311 W. 43rd St., New York 36, N. Y. JUdson 6-5880

Infilco, Inc., 901 S. Campbell, Tucson, Ariz. MAin 3-5401

Infrared Industries, Inc., 62-4th Ave., Waltham 54, Mass. TWinbrook 3-5400

Insco Co., Div. of Barry Controls, Inc., Hollis St., Groton, Mass. GIlbert 8-6358

Instrol Inc., 135E. De la Guerra St., Santa Barbara, Calif. WOodland 51691

Instron Engineering Corp., 2500 Washington St., Canton, Mass. CAnton 6-2500

Instrulab, Inc., 1205 Lamar St., Dayton 4, Ohio BA-3-2241
(See advertisement on page 209)

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Instrument Corp. of Florida, P.O. Box 1226, Melbourne, Fla. PArkway 3-8112

Instrument Development Co., 1019 Emerson Ave., Salt Lake City, 5, Utah. IN 6-4285

Instrument Development Laboratories, Inc., 67 Mechanic St., Attleboro, Mass. ATtleboro 1-3880

Instrument Laboratories, 315 W. Walton Place, Chicago 10, Ill. MI 2-0123

Instrument Mirror Co., Div. Houston Instr. Corp., 1514 Foley St., Houston 24, Tex. HOmestead 8-2696
(See advertisement on page 169)

Instruments, Inc., 3102 Sand Springs Rd., Tulsa, Okla. CH 24151

Intercontinental Electronics Corp., 1551 Franklin Ave., Mineola, N. Y. PIoneer 6-5010

Interelectronics Corp., 2432 Grand Concourse, New York 58, N. Y. Ludlow 4-6200
(See advertisement on page 159)

International Electronic Research Corp., 145 W. Magnolia Blvd., Burbank, Calif. Victoria 9-2481

International Instrument Co., Canyon, Calif. DRake 6-4673

International Radiant Corp., 111 New York Ave., Westbury, L. I., N. Y. EDgewood 4-8820

International Rectifier Corp., 233 Kansas St., El Segundo, Calif. ORegon 8-6281
(See advertisement on page 151)

International Register Co., Instrument Div., 2630 W. Washington Blvd., Chicago 12, Ill. VAn Buren 6-4242
(See advertisement on page 51)

International Research & Development Corp., 6150 Huntley Rd., Worthington, Ohio TUexdo 5-5376

International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa. WA 2-2166 Ext. 310

Ipsen Industries, Inc., 715 So. Main St., Rockford, Ill. WOodland 5-9581

Iron Fireman Mfg. Co., Electronics Div., 2838 S.E. 9th Ave., Portland 2, Oregon BElmont 4-6551

Isotopes Specialties Co., Div. of Nuclear Corp. of America, 170 W. Providencia, Burbank, Calif. -VI 9-2273

Itemeo, Inc., P. O. Box 191, Port Washington, N. Y. POrt Washington 7-8330
(See advertisement on page 19)

J

J-B-T Instruments, Inc., New Haven 8, Conn.
(See advertisement on pages 102, 103)

JFD Electronics Corp., 6101-16th Ave., Brooklyn 2, N. Y. DEwey 1-1000

J-V-M Microwave Co., 9300 W. 4th St., Brookfield, Ill.
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Jaegers Optical Corp., 692 Merrick Road, Lynbrook, New York
(See advertisement on page 169)

Jaidinger Mfg. Co., Inc., 1921 W. Hubbard St., Chicago 22, Ill.
(See advertisement on page 172)

James Vibrapowr Co., 4050 N. Rockwell St., Chicago 18, Ill. CO 7-6333

Jamesbury Corp., 115 New St., Worcester, Mass.

Jan Hardware Mfg. Co., Inc., 38-01 Queens Blvd., Long Island City 1, New York EMpire 1-0800

Jarrell Ash Co., 26 Farwell St., Newtonville 60, Mass. DEcatur 2-2130

Jeffrey Mfg. Co., 797 No. 4th St., Columbus 16, Ohio

Jennings Radio Mfg. Corp., 970 McLaughlin Ave., San Jose 8, Calif. CYpress 2-4025

Jerguson Gage & Valve Co., 100 Adams St., Burlington, Mass.
(See advertisment on page 42)

Jensen Tool Co., H. C., 16 Mechanic St., Waltham 54, Mass. TW 3-7940

Jerber Engineering Co., 2334 Secane Rd., Secane, Pa.

Jo-Bell Products, Inc., 5456 W. 111th St., Oak Lawn, Ill. GArden 5-0240

Johanson Mfg. Corp., P. O. Box 329, Boonton, N. J. DEerfield 4-2676

Johnson Corp., 805 Wood St., Three Rivers, Mich. Telephone 21715

Johnson Engrg. Co., Welton V., Inc., 95 Summit Ave., Summit, N. J. CRestview 7-4200
(See advertisement on page 192)

Johnson Mfg. Co., Inc., 148 Main St., Monroeville, Ind. Telephnoe 8811

Johnson Service Co., 507 E. Michigan St., Milwaukee 1, Wis. BR-6-9200
(See advertisement on page 29)

Johnson-Williams, Inc., 2625 Park Blvd., Palo Alto 13, Calif. DAvenport 3-4131

Jo-Line Tools, Inc., 8442 Otis St., South Gate, Calif. LOrain 7-1489

Jones Div., Howard B., 1026 S. Homan Ave., Chicago 24, Ill. NE 2-2000

Jones Motrola Corp., 432 Fairfield Ave., Stamford, Conn. DAvis 4-7381

Jones Optical Works, 2400 Massachusetts Ave., Cambridge 40, Mass.—TRowbridge 6-3368—3369
(See advertisement on page 160)

Joy Manufacturing Co., Electrical Prods. Div., 1021 Macklind Ave., St. Louis 10, Mo. MIssion 5-6670

Julie Research Laboratories, Inc., 556 W. 168th St., New York 32, N. Y. LO 8-8700

K

K-F Development Co., 2606 Spring St., Redwood City, Calif. EMerson 8-5670

Kahn & Co., Inc., 541 Windsor St., Hartford 1, Conn. CHapel 6-7431

Karn Chemical Equip. Co., 518 Dickson Ave., Pittsburgh 2, Pa. WEllington 1-2983
(See advertisement on page 68)

Karnish Instrument Sales & Service, Inc., 3rd Ave. & Maple, Lock Haven, Pa. LOck Haven 7711

Karr Co., R. J., 1605-16th St., Wyandotte, Mich. AV 4-4100

Kates Co., W. A., 436 Waukegan Road, Deerfield, Ill. WIndsor 5-0950
Rep—W. Pa., W. Va. Md. Panhandle, Ohio Border
Sentinel Products Co. (Wayne B. Farley)
36 Beltzhoover Ave., Pittsburgh 10, Pa.
HEmlock 1-0774

Kato Engineering Co., Mankato, Minn. Telephone 8-2941
(See advertisement on page 101)

Kavamil Co., Inc., 1501 W. El Segundo Blvd., Compton, Calif. NEvada 6-9600

Kay Electric Co., Maple Ave., Pine Brook, N. J. CApital 6-4000

Kearfott Co., Inc., 1500 Main Ave., Clifton, N. J. GEegory 2-1000

Kearfott Microwave Div., Kearfott Co., Inc., 14844 Oxnard St., Van Nuys, Calif. STate 6-1760

Kearney Industries, Delanium Graphite Div., P.O. Box 501, So. Plainfield, N. J. LIberty 9-7800

Keckley Co., O. C., 3400 Cleveland St., Skokie, Ill. ORchard 4-8422

Keim Precision Mirrors Corp., 1346 E. Colorado St., Glendale 5, Calif. CH 5-2725

Keller, Hugo P., 50 E. 42nd St., New York 17, N. Y. MUrray Hill 2-8450
(See advertisement on page 154)

Kelvin Electric Co., 5907 Noble Ave., Van Nuys, Calif. STate 2-6662

Kendrick & Davis Co., 11 Water St., Lebanon 2, New Hamp. LEb. 13

Kensico Tube Co., Inc., Mount Kisco, N. Y. Mount Kisco 6-8046
(See advertisement on page 187)

Kemlite Laboratories, Inc., 1819 W. Grand St., Chicago 22, Ill. TA 9-6050

Kemp Mfg. Co., C. M., 405 E. Oliver St., Baltimore 2, Md. VErnon 7-1190

Kessler Co., Inc., Frank, 41-45 47th St., Long Island City 4, New York ST.Ilwell 4-0263
(See advertisement on page 183)

Kieley & Mueller, Inc., 64 Genung St., Middletown, N. Y. DI 2-2526
Pittsburgh Area Representative
W. A. Stoeltzing, Inc.
940 Western Ave., Pittsburgh 33, Pa.
ALlegheny 1-9400

Kings Electronics Co., Inc., 40 Marbledale Rd., Tuckahoe, N. Y. SWiftwater 3-5000

King Engineering Corp., P. O. Box 650, Ann Arbor, Mich. NO. 2-5651
(See advertisement on page 41)

King Tester Corp., 444 N. 13th St., Philadelphia 23, Pa.

Kingston Industries, Inc., North St., Medfield, Mass. FLeetwood 9-4347

Kintronic Div., Chicago Aerial Industries, 10134 Pacific Ave., Franklin Park, Ill. GLadstone 1-1830

Kirkland Co., H. R., 10 King St., Morristown, N. J. JEfferson 8-2777

Kistler Instrument Corp., 15 Webster St., N. Tonawanda, N. Y. Jackson 2939

Klipfel Valves, Inc., 1075 Lincoln Ave., Hamilton, Ohio TWinbrook 5-5661

Knopp Inc., 1307-66th St., Oakland 8, Calif. OLympic 3-1661

Koehler Instrument Co., Inc., 168-56 Douglas Ave., Jamaica 33, N. Y. JAmaica 3-7188

Koontz-Wagner Electric Co., Inc., 516 N. Michigan St., South Bend 1, Ind. CEntral 3-8251

Kollmorgen Optical Corp., 347 King St., Northampton, Mass. JUstice 4-0280

Kruger Instruments, Harold, 313 W. Valley Blvd., San Gabriel, Calif. AT 4-3541

Kulka Electric Corp., 633 So. Fulton Ave., Mt. Vernon, N. Y. MO 4-4024
(See advertisement on page 179)

Kunkle Valve Co., 121 So. Clinton St. Ft. Wayne, Ind. A-7283
(See advertisement on page 52)

Kurman Electric Co., Div. of Norbute Corp., 191 Newel St., Brooklyn 22, N. Y. EVergreen 3-8000

Kurz-Kasch, Inc., 1421 S. Broadway Dayton 1, Ohio. BAldwin 3-8161

Kwikheat Mfg. Co., 3732 San Fernando Rd., Glendale 4, Calif. CHapman 5-2376

L

L.A.B. Corporation, E. Onondaga, Skaneateles, N. Y. OVerbrook 5-5781

L & L Mfg. Co., 136-8th St., Upland, Del. Co., Pa. TRemont 2-5164

L & R Mfg. Co., 577 Elm St., Kearny (Arlington), N. J. Wyman 1-5330

Labline, Inc., 3070-82 W. Grand Ave., Chicago 22, Ill. SAcramento 2-5151

Laboratory Construction Co., 8815 Prospect., Kansas City, Mo. EM-3-1355

Laboratory for Electronics, Inc., 1079 Commonwealth Ave., Boston 15, Mass. ALgonquin 4-4235

Lafayette Instrument Co., By-Pass 52, Lafayette, Ind. SH-2-7937

Lake Erie Electric Mfg., Inc., 2952 W. 22nd St., Erie, Pa.
Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Lamb Electric Co., Div. of Am. Machine & Metals, Inc. Lake St., Kent, Ohio. ORchard 3-3451

Lambda Electronics Corp., 11-11 131st St., College Point 56, N. Y. INdependence 1-8500

Lampkin Laboratories, Inc., IAC Div., Bradenton, Florida Telephone 6-1906

Lancaster Glass Corp., 220 West Main St., Lancaster, Ohio OLive 3-0311

Land-Air, Inc., 7444 W. Wilson Ave., Chicago 31, Ill. Underhill 7-7550

Landis & Gyr, Inc., 45 W. 45th St., New York 36, N. Y. JU-6-4644

Landsverk Electrometer Co., 641 Sonora Ave., Glendale 1, Calif. CHapman 56687
(See advertisement on page 124)

Langmar Corp., 4875 W. Armitage Ave., Chicago 39, Ill. BE-7-3375
(See advertisement on page 70)

Lansdale Tube Co., Div. of Philco Corp., Lansdale, Pa.

Lapp Insulator Co., Inc., Process Equip. Div., Lapp St., Leroy, N. Y. Telephone 385

Largent Co., P.O. Box 9845, Houston 15, Texas

Larson Instrument Co., 24 Orchard St., Tarrytown, N. Y. MEdford 1-3419

Lavallee & Ide, Inc., Grape St., Chicopee, Mass. Lyceum 4-6601

LaVezzi Machine Works, 4635 W. Lake St., Chicago 44, Ill. ESterbrook 8-1636

Lavoie Laboratories, Inc., Matawan-Freehold Road, Rte. 79, Morganville, N. J. LOwell 6-2600

Leach Corp., 18435 Susana Road, Compton, Calif. NEvada 6-1061
(See advertisement on page 177)

Leach Relay Div., Leach Corp., 5915 Avalon Blvd., Los Angeles 3, Calif.

Ledeen Inc., 3350 No. Gilman Rd., El Monte, Calif. CUmberland 3-3163

Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa. DAvenport 9-4900

Lee Spring Co., Div. of Leetronics Inc., 30 Main St. Brooklyn 1, N. Y. ULster 5-7163

Leetronics, Inc., 30 Main St., Brooklyn 1, N. Y. ULster 5-7163

Leiman Bros., Inc., 146-181 Christie St., Newark 5, N. J. MA-3-7520

Lel, Inc., 380 Oak St., Copiague, N. Y. AMityville 4-2200

Leland Inc., G. H. 123 Webster St., Dayton 2, Ohio BAldwin 4-9891

Lenox Instrument Co., 2010 Chancellor St., Philadelphia 3, Pa. RIttenhouse 6-6653

Leonard, Inc., Wallace O., 373 So. Fair Oaks Ave., Pasadena, Calif. SYCamore 2-7131 or RYan 1-4446

Lepel High Frequency Laboratories, Inc., 54-18 37th Ave., Woodside 77, N. Y. HAvemeyer 6-4580

Lerco Electronics, Inc., 501 So. Varney St., Burbank, Calif. Victoria 9-5556

Leroy M. E. Clausing Co., 8038 Monticello Ave., Skokie, Ill. Chicago Tel. COrnelia 7-3399

Leslie Co., 122 Delafield Ave., Lyndhurst, N. J. GEneva 8-8000
Pittsburgh Representative
Harold G. Jones Company
602 Empire Bldg., Pittsburgh 22, Pa.
ATlantic 1-8212

Levin & Son, Louis, 3610 S. Broadway, Los Angeles 7, Calif. ADams 3-7169

Levy & Co., Inc., Max, Wayne Ave. & Berkley St., Philadelphia 44, Pa. DA-9-7675
(See advertisement on page 178)

Lewis Engineering Co., 339 Church St., Naugatuck, Conn. PArk 9-5253
(See advertisement on page 21)

Lewis and Kaufman, Ltd., 17320 El Rancho Ave., Los Gatos, California. ELgato 4-3540

Librascope, Inc., 808 Western Ave., Glendale 1, Calif. CItrus 4-6541
Northeastern Rep—Burbank Div.
Davidson and Hemmendinger
2857 Nazareth Rd., Easton, Pa.
BLackburn 8-2345

Lignum-Vitae Products Corp., 96-1P Boyd Ave., Jersey City 4, N. J. HE-3-3027-8
(See advertisement on page 152)

Lind Corp., Research Park, Princeton, N. J. WAlnut 1-8844

Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill.

Linear Controls Co., 3400 Main, Skokie, Ill. ORchard 6-1667

Link Aviation, Inc., Binghamton, N. Y. RA-3-9311
(See advertisement on page 130)

Liquidometer Corp., Industrial Div., 41-03 36th St., Long Island City 1, N. Y. STillwell 4-1440
(See advertisement on page 42)

Littelfuse, Inc., 1865 Miner St., Des Plaines, Ill. VA 4-1188
(See advertisement on page 166)

Loe Engineering Co., 237 N. Fair Oaks, Pasadena, Calif.
(See advertisement on page 121)

Lord Manufacturing Co., 1635 W. 12th St., Erie, Pa. GLendale 6-8511

Los Angeles Scientific Instrument Co., 2451 Riverside Dr., Los Angeles 39, Calif. NO-2-2128
(See advertisement on page 141)

Lovejoy Flexible Coupling Co., 4843 W. Lake St., Chicago 44, Ill. ES-9-3010

Lucifer Furnaces, Inc., 374 Easton Road, Neshaminy, Pa. Diamond 3-0411

Luther Mfg. Co., 7312 Varna Ave., No. Hollywood, Calif.

Luxo Lamp Corp., Dock St., Port Chester, N. Y. WEstmore 7-4433

Lynn, Robert M., 319 N. Santa Anita Ave., Arcadia, Calif.
(See advertisement on page 210)

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M-H (see Minneapolis-Honeywell)

MM Enclosures, Inc., 111 Bloomingdale Road, Hicksville, L. I., N. Y. WEIls 1-1770

M & Q Plastic Products, Bannard St., Freehold, N. J. FReehold 8-6663

MSA Research Corp., Callery, Pa. Evans City 3510

Machinery Electrification, Inc., 35 Hudson St., Northboro, Mass. EXeter 32461

Mack Electric Devices, Inc., 38 Glenside Ave., Wyncote, Pa. TUrner 4-8123
(See advertisement on page 210)

MacLaren & Co., F. B., 6 West 18th St., Huntington Station, New York. HA 3-4433

Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. UNderhill 7-8000

Magnasync Manufacturing Co., Ltd., 5546 Satsuma Ave., No. Hollywood, Calif. ST 7-5493

Magnavox Co., Research Labs., 2255 S. Carmelina Ave., Los Angeles 64, Calif. BR 2-0347

Magnecraft Electric Co., 3352 W. Grand Ave., Chicago 51, Ill. Everglade 4-6868

Magnetic Instrument Co., Inc., 548 Commerce St., Thornwood, N. Y. RO 9-5312

Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif. OSborne 5-1171

Magnetic Shield Div., Perfection Mica Co., 1322 N. Elston Ave., Chicago 22, Ill. EVerglade 4-2122
(See advertisement on page 167)

Magnetico, Inc., 6 Richter Court, E. Northport, N. Y. ANdrew 1-4502

Magnetrol, Inc., 2110 So. Marshall Blvd., Chicago 23, Ill. BIshop 7-4000
(See advertisement on page 42)

Main & Sons, Inc. Robt. A., 461 W. Main St., Wyckoff, N. J.

Malco Manufacturing Co., 4025 West Lake St., Chicago 24, Ill. VAn Buren 6-9300

Mallory & Co. Inc., P. R., 36 So. Gray St., Indianapolis 6, Ind. MElrose 6-5353

Manning, Maxwell & Moore, Inc., Stratford, Conn. DRexel 8-8281

Mansfield & Green, Inc., 1051 Power Ave., Cleveland 14, Ohio. MAin 1-7565
(See advertisement on page 54)

Manson Laboratories, Inc., 375 Fairfield Ave., Stamford, Conn. DAvis 5-1391

Marathon Battery Co., 840 Henrietta St., Wausau, Wis. Telephone 2-1071

Marathon Electric Mfg. Corp., Wausau, Wis. Telephone 2-2011

Marconi Instruments, 111 Cedar Lane, Englewood, N. J. LO-7-0607-8-9

Mark-Tex Corp., 453 W. 17th St., New York 33, N. Y. WAtkins 9-1811

Marotta Valve Corp., 1500 Boonton Ave., Boonton, N. J. DEerfield 4-2791

Marquardt Corp., Pomona Div., 2709 N. Garey Ave., Pomona, Calif. LYcoming 3-1311

Marsh Instrument Co., 3501 Howard St., Skokie, Ill. ORchard 3-4300
(See advertisement on page 54)

Marshall Co., L. H., Station B, Columbus 2, Ohio AX 9-4159

Marshall Instruments Inc., 14203 Bessemer St., Van Nuys, Calif. STate 2-4014

Marshalltown Mfg. Co., 800 E. Nevada St., Marshalltown 3, Iowa. Telephone 4461
(See advertisement on page 49)
Pittsburgh Representative
Harold G. Jones Company
602 Empire Bldg., Pittsburgh 22, Pa.
ATlantic 1-8212

Martin & Co., H. S., 1916 Greenleaf St., Evanston, Ill. GR 5-0707
(See advertisement on page 121)

Martindale Electric Co., 1360 Hird Ave., Cleveland 7, Ohio. LAkewood 1-8567

Marx Co., Clarence J., 164 East 199th St., Cleveland 19, Ohio. KEnmore 1-8952
(See advertisement on page 61)

Mason-Neilan Div., Worthington Corp., 55 Nahatan St., Norwood, Mass. NOrwood 7-4600
(See advertisement on page 75)

Massa Div. of Cohu Electronics, Inc., 5 Fottler Rd., Hingham, Mass. RIverview 9-4800

Mast Development Co., Inc., 2212 E. 12th St., Davenport 30, Iowa. Telephone 3-9729

Master Specialties Co., 956 East 108th St., Los Angeles 59, Calif. LOrain 4-4481

Maxson Corp., W. L., 475 Tenth Ave., New York 18, N. Y. LOngacre 5-1900

Mayer Co., Inc., Geo. J., 546 E. Market St., Indianapolis 9, Ind. MElrose 6-6422
(See advertisement on page 169)

McCoy Electronics Co., Chestnut and Watts St., Mount Holly Springs, Penna. HUnter 6-2411

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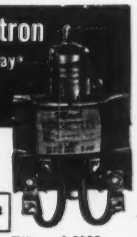

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McDanel Refractory Porcelain Co., 510 9th Ave., Beaver Falls, Pa. TIlden 3-8300

McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill. COrnelia 7-1600

McHugh & Son, Raymond F., Box 6025, Philadelphia 14, Pa. MA 4-8009

McIlvaine, O. T., 15 So. First St., Geneva, Ill. GEneva 7150

McKenna Laboratories, 2503 Main St., Santa Monica, Calif. EXbrook 9-8846

McLean Engineering Laboratories, 70 Washington Road, P.O. Box 228, Princeton, N. J. WAlnut 4-4440

McMillan Laboratories, Inc., Brownville Ave., Ipswich, Mass.
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Measurements Div., Mc-Graw-Edison Co., Box 180, Boonton, N. J.
(See advertisement on page 103)

Measurements Research Co., 3801 Castor Ave., Philadelphia 24, Pa. JEfferson 5-0911

Mechanical Products, Inc., 1824 River St., Jackson, Mich. STate 2-0391

Meikle Manufacturing Co., 1335 So. MacArthur Blvd., Springfield, Ill. Telephone 2-1680

Mercoid Corp., 4201 Belmont, Chicago 41, Ill. Pensacola 6-2100
(See advertisement on page 180)
St. Louis Representative
Fillo Sales & Engineering Co.
4401 Choteau Ave., St. Louis, Mo.
JEfferson 1-0477

Meriam Instrument Co., 10920 Madison Ave., Cleveland 2, O. ATlantic 1-1100
(See advertisement on page 38, 44)

Merz Engineering, Inc., 200 So. Harding St., Indianapolis 7, Ind. MElrose 2-7431

Metalab Equipment Co., Duffy Ave., Hicksville, L. I., N. Y.

Metalphoto Corp., 6811 Superior Ave., Cleveland 3, Ohio UTah 1-7575

Metals & Controls Div., Texas Instruments Inc., 34 Forest St., Attleboro, Mass. Telephone 1-2800

Metavac, Inc., 45-68 162nd St., Flushing 58, New York Hickory 5-0400
(See advertisement on page 171)

Meters Inc., 5353 N. Keystone Ave., Indianapolis 20, Ind. CLifford 5-3570

Metrol, Inc., 17 E. Holly St., Pasadena, Calif. SYcamore 3-3085

Metron Instrument Co., 432 Lincoln St., Denver 3, Colo. PEarl 3-3764

Metronix, Inc., 75 Wilson Mills Road, Chesterland, Ohio HAmilton 3-4440

Metzger & Son, F. F., 2600 N. 6th St., Philadelphia 33, Pa. BA 9-3161

Mico Instrument Co., 80 Trowbridge St., Cambridge 38, Mass. KI 7-8660
(See advertisement on page 168)

Micro Balancing, Inc., 191 Herricks Road, Garden City Park, L. I., N. Y. PI 6-0851

Micro Gee Products, Inc., 6319 W. Slauson Ave., Culver City, Calif. EXmont 1-1716

Micro-Circuits Co., New Buffalo, Mich. Telephone 272-W-1

Microdot, Inc., 220 Pasadena Ave., So. Pasadena, Calif. RYan 1-3351

Microloc Corp., 5743 Marilyn Ave., Culver City, Calif. TExas 05535

Micromat Co., 548 Piermont Ave., Hillsdale, N. J.

Micrometrical Manufacturing Co., 345 So. Main St., Ann Arbor, Mich. NOrmandy 2-5626

Micronics Div., Elgin National Watch Co., 366 Bluff City Blvd., Elgin, Ill. SHerwood 2-5700

Microsonics Inc., Hingham Industrial Ctr., Hingham, Mass. RI-9-3100

Microtran Co., Inc., 145 E. Mineola Ave., Valley Stream, N. Y. LO-1-6050

Microwave Associates, Inc., South Ave., Burlington, Mass. BRowning 2-3000

Microwave Development Laboratories, Inc., 92 Broad St., Babson Park 57, Wellesley, Mass. CEdar 5-6252

Midwestern Instruments, P.O. Box 7186, Tulsa 12, Okla. RIverside 7-1331

Milgo Electronic Corp., 7601 NW 37th Ave., Miami 47, Fla. OX 1-1220

Miller & Associates, David, Box 572, Beverley Hills, Calif. OL 57861

Miller Company, L. C., 5005 E. Slauson, Los Angeles 22, Calif. Ludlow 3-1065

Miller Falls Co., 57 Wells St., Greenfield, Mass. PR 3-5426

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1343 Sprint Street, N. W.
Telephone: Trinity 4-6378

CHICAGO 10, ILLINOIS
144 West Superior Street
Telephone: Michigan 2-3575

NEW ORLEANS, LOUISIANA
3000 Toulouse Street
Telephone: Amherst 5368

DETROIT 3, MICHIGAN
19725 Ralston
Telephone: Townsend 8-5855

KANSAS CITY 8, MISSOURI
2603 Cherry Street
Telephone: Baltimore 1-9787

BUFFALO 9, NEW YORK
1718 Main Street
Telephone: Garfield 4526

NEW YORK, NEW YORK
1100 Globe Avenue
Mountain Side, N. J.
Telephone: Adams 2-3490

PHILADELPHIA 3, PENNA.
1614 Summer Street
Telephone: Locust 4-1216

PITTSBURGH 8, PENNA.
201 North Braddock Avenue
Telephone: Churchill 1-5900

HOUSTON 6, TEXAS
3745 Greenbriar Drive
Tele.: Jackson 3-3636, 7 & 8

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MINE SAFETY APPLIANCES COMPANY
Pittsburgh 8, Pennsylvania

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Millivac Instruments Div., Cohu Electronics, Inc., 2315 Second Ave., Carmen, Schenectady, N. Y. Elgin 5-6550

Milman Engineering Co., 1831 Pontius Ave., Los Angeles 25, Calif. GRanite 3-0616

Milton Ross Metals Co., 239 Jacksonville Rd., Hatboro, Pa. OSbourne 2-0550

Milton Roy Company, 1303 Mermaid Lane, Philadelphia 18, Pa. CHestnut Hill 7-8000

Minarik Electric Co., 224 E. Third St., Los Angeles 13, Calif. MAdison 4-3161

Minco Products, Inc., 740 Washington Ave., N., Minneapolis 1, Minn. FEderal 8-6753

Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa. CH 1-5900
(See advertisement on page 211)

Miniature Precision Bearings, Inc., Precision Park, Keene, N. H. EL-2-1888

Minneapolis Electric & Construction Co., 80 S. 12th St., Minneapolis 3, Minn. FE 2-0946

Minneapolis- Honeywell Regulator Co., Aeronautical Div., 2600 Ridgeway Road, Minneapolis 13, Minn. ST 1-8011

Minneapolis-Honeywell Regulator Co., Boston Div., 40 Life St., Boston 35, Mass. AL-4-5200

Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa. DAvenport 9-8300

Minneapolis-Honeywell Regulator Co., Davies Laboratories Div., 10721 Hanna St., Beltsville, Md. WEbster 5-2700

Minneapolis-Honeywell Regulator Co., Heiland Div., 5200 E. Evans Ave., Denver 22, Colo. SKyline 6-3681

Minneapolis-Honeywell Regulator Co., Marion Instrument Div., Grenier Field, Manchester, N. H. WA-5-6971

Minneapolis-Honeywell Regulator Co., Micro Switch Div., 11 W. Spring St., Freeport, Ill. ADams 2-1122

Minneapolis-Honeywell Regulator Co., Missile Equipment Div., Queen & So. Bailey, Pottstown, Pa.

Minneapolis-Honeywell Regulator Co., Rubicon Instruments Div., Ridge Ave. at 35th St., Philadelphia 32, Pa. BAldwin 5-3737

Minneapolis-Honeywell Regulator Co., Valve Div., Fort Washington, Pa. MItchell 6-1780

Minnesota Mining & Mfg. Co., Magnetic Products Div., 900 Bush Ave., St. Paul 6, Minn. PRospect 6-8511

Missouri Research Labs., Inc., 2109 Locust St., St. Louis 3, Mo. CHestnut 1-7875

Mixing Equipment Co., Inc., 135 Mt. Read Blvd., P.O. Box 1370, Rochester 3, N. Y. ID 6-5550

Model Engrg. & Mfg., Inc., 50 Frederick St., Huntington, Ind. Telephone 104

Model Rectifier Corp., 1675 Utica Ave., Brooklyn 34, N. Y. CLoverdale 8-6800

Modern Industries, Inc., 5755 Camille Ave., Culver City, Calif. TExas 02020

Modern Laboratory Equipment Co., Inc., 1809-11 First Ave., New York 28, N. Y. TR 6-4700

Moeller Instrument Co., 132 St. & 89th Ave., Richmond Hill 18, N. Y. Virginia 9-2100
(See advertisement on Inside Back Cover)

Molex Products Co., 9515 Southview Ave., Brookfield, Ill. HUnter 5-5881

Monroe Calculating Machine Co., Components Div., 60 Main St., San Francisco 5, Calif. DO 2-7328

Monroe Calculating Machine Co., Electronics Div., 555 Mitchell St., Orange, N. J. OR 3-6600

Montgomery Mfg. Co., 212 S. Main, Owensville, Ind. SAratoga 4-2505

Moog Servocontrols, Inc., Proner Airport, E. Aurora N. Y. CYpress 2000
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Allied Components Inc.
2517 Converse St., Dallas 7, Texas
Riverside 2-2830

Moore Associates, Inc., 2600 Spring St., Redwood City, Calif. EMerson 9-0204

Moore & Co., Samuel, Dekoron Products Div., Main & Orchard St., Mantua, Ohio, CRestwood 4-2276
(See advertisement on pages 142, 143)

Moore Products Co. H & Lycoming Sts., Philadelphia 24, Pa. JE 3-3500

Morehouse Machine Co., 1742 Sixth Ave., York, Penna. Telephone 81332
(See advertisement on page 134)

Morris Co., J. L., 384 Elm St., Southbridge, Mass. POrter 4-4394

Moseley Co., F. L., 409 N. Fair Oaks Ave., Pasadena, Calif. RYan 1-0208
(See advertisement on pages 116, 117)

Moser Jewel Co., 544 Fayette St., Perth Amboy, N. J. Hillcrest 2-3434
(See advertisement on page 153)

Motech Co., P.O. Box 6009, Kansas City 10, Mo. LOgan 1-0202
(See advertisement on page 65)

Motorola C&E Inc., 4501 W. Augusta, Chicago 51, Ill. SP 2-6500

Motson Co., J. Frank, 1717 Bethlehem Pike, Flourtown, Pa. CHestnut Hill 7-1900

Mucon Corp., 9 St. Francis St., Newark 5, N. J.

Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill. Telephone 3-4471

Mueller Electric Co., 1583 E. 31st St., Cleveland 14, Ohio

Muirhead Instruments, Inc., 441 Lexington Ave., New York 17, N. Y. MUrray Hill 2-8131

Multi-Amp Corp., 465 C Lehigh Ave., Union, N. J. MUrdock 8-7112

Murphy Mfg. Inc., Frank W. 3137 S. Sheridan, Tulsa 24, Okla. TE 8-3387

Murphy & Miller, Inc., 620 W. Taylor St., Chicago 7, Ill. HArrison 7-8900
(See advertisement on page 34)

N

NJE Corporation, 20 Boright Ave., Kenilworth, N. J. BRidge 2-6000

N/P Company, P.O. Box 127, Temple City, Calif. ATlantic 7-9223

NRC Equipment Corp., 160 Charlemont St., Newton 61, Mass. DE 2-5800

Nanmac Corp., 55 Glymont Road, Indian Head, Md. Riverside 82011
(See advertisement on page 65)

Narda Ultrasonic Corp., 625 Main St., Westbury, L. I. N. Y. EDgewood 3-5400

Nash Engineering Co., So. Norwalk, Conn. VOlunteer 6-3351
(See advertisement on page 18)

National Appliance Co., 7634 S.W. Capitol Hwy., Portland 19, Ore. CHerry 6-3316

National Carbon Co., Div. of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y. Murray Hill 7-8000

National Electronics Inc., 628 North St., Geneva, Ill. Telephone 7000

National Instrument Co., Inc., 4119-4127 Fordleigh Rd., Baltimore 15, Md. ROgers 4-3304

National Instrument Labs., Inc., 840 Evarts St., N. E., Washington 18, D. C. NOrth 7-7582
(See advertisement on page 36)

National Radiac Inc., 475 Washington St., Newark 2, N. J. MA 3-7524

National Semiconductors Ltd., 146 Bates Road, Montreal 26, P.Q., Canada. RE-7-4031

National Spectrographic Laboratories, Inc., 6300 Euclid Ave., Cleveland 3, Ohio UTah 1-4664

National Time & Signal Corp., 21800 Wyoming Ave., Detroit 37, Mich. JOrdan 46281

National Ultrasonic Corp., 111 Montgomery Ave., Irvington 11, N. J. ESsex 1-0550

National Vulcanized Fibre Co., Maryland Ave. & Beech Sts., Wilmington 99, Del. OLympia 5-6371

Navigation Computer Corp., 1621 Snyder Ave., Philadelphia 45, Pa. HO 5-7700

Naybor Laboratories, Inc., E. V., 26 Manorhaven Blvd., Port Washington, N. Y. POrt Washington 7-4300

Nems-Clarke Co., Div. of Vitro Corp. of Amer., 919 Jesup-Blair Drive, Silver Spring, Md. JUniper 5-1000

Neptune Meter Co., 19 West 50th St., New York 20, N. Y.

Nester Co., Inc., L. G., P.O. Box 231, Buck & Sassafras Sts., Millville, N. J. TAylor 5-0254
(See advertisement on page 188)

Networks Electronic Corp., 14806 Oxnard St., Van Nuys, Calif. STate 2-3114

Neutronic Associates, Inc., 93-14 101st Ave., Ozone Park 16, New York. Virginia 7-7703

New Departure Div., General Motors Corp., 269 N. Main St., Bristol, Conn., Ludlow 2-6371
(See advertisment on page 145)

New England Transformer Co., Inc., 47 McGrath Highway, Somerville 43, Mass. SOmerset 6-6100

New Hampshire Ball Bearings, Inc., Peterborough, N. H. WAlnut 4-3311

New Jersey Meter Co., Inc., 350 Leland Ave., Plainfield, N. J.

New York Transformer Co., Inc., 3rd Ave., Alpha, N. J. GLencourt 4-1143

Newage Industries, Inc., 222 York Rd., Jenkintown 21, Pa. TU 4-8494

Newark Controls Co., 15 Ward St., Bloomfield, N. J. PIlgrim 8-2971

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Newman Corp., M. M., 79 Clifton Ave., Marblehead, Mass. NEptune 2-0637

Non-Linear Systems, Inc., Del Mar Airport, Del Mar, Calif. SKyline 5-1134

Norcross Corp., 247 Newtonville Ave., Newton 58, Mass. DECatur 2-3410
(See advertisement on page 127)

Norman Hardy Associates, Box 97, Wyncote, Penna. TUrner 7-3955

North American Mfg. Co., 4455 E. 71st St., Cleveland 5, O. BRoadway 1-6000

North Atlantic Industries, Inc., 603 Main St., Westbury, N. Y. EDgewood 4-1122

North Electric Co., 553 So. Market St., Galion, O. HO 8-2420

North Hills Electric Co., Inc., 402 Sagamore Ave., Mineola, L. I., N. Y. Pioneer 7-0555
(See advertisement on page 112)

North Shore Nameplate Inc., 214-27 Northern Blvd., Bayside 61, N. Y. BA 4-4000
(See advertisement on page 169)

Northeastern Engrg., Inc., 25 S. Bedford St., Manchester, N. H. NAtional 2-6485

Norwood Controls, 934 Washington St., Norwood, Mass. NOrwood 7-4010
(See advertisement on pages 24, 25)

Nuclear-Chicago Corp., 223 W. Erie St., Chicago 10, Ill. DElaware 7-3060

Nuclear Corp. of America, Instr. & Research Div., 2 Richwood Place, Denville, N. J. WOrth 2-7628

Nuclear Development Laboratory, P. O. Box 7034, Kansas City 13, Mo. DElmar 3-7692

Nuclear Electronics Corp., 2925 N. Broad St., Philadelphia 32, Penna. BAldwin 6-2300

Nuclear Materials and Equipment Corp., Apollo, Pa. GRover 2-8411

Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Ind. LI 6-2415
(See advertisement on page 124)

Nucleonic Corp. of America, 196 Degraw St., Brooklyn 31, N. Y. MAin 4-7370

Nurnberg Thermometer Co., Scientific Div., 124 Livingston St., Brooklyn 1, N. Y. RE 5-2393

Nylon Molding Corp., 141 South Ave., Garwood, N. J. SUnset 9-1414

O

O.K. Machine & Tool Corp., 551 E. 179th St., New York 57, N. Y. CY-8-0900
(See advertisement on page 122)

OPW-Jordan, Dept. IC, 6013 Wiene Rd., Cincinnati 13, Ohio. WE 1-1263

Oak Manufacturing Co., 1260 Clybourn Ave., Chicago 10, Ill. MO 4-2222

Offner Electronics, Inc., 3900 River Road, Schiller Park, Ill. GLadstone 1-0050

Ohaus Scale Corp., 1050 Commerce Ave., Union, N. J. MUrdock 8-3400

Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio. CL 2-6100

Ohio Chemical & Surgical Equipment Co., Div. of Air Reduction Co., Inc., 1400 E. Washington Ave., Madison, Wis. ALpine 6-5421

Ohio Semiconductors, Inc., 1035 W. Third Ave., Columbus 8, Ohio. AX 4-4938

Ohmart Corp., 2236 Bogen St., Cincinnati 14, Ohio
Detroit Representative
The Basic Service Corp.
16544 Plymouth Rd., Detroit, Mich.
VErmont 7-8820

Rep—New York, New Jersey Area
George H. Birchall Co., Inc.
P. O. Box 84, Westfield, N. J.
ADams 2-3600

Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis. MItchell 5-6715

Okonite Co., Passaic, N. J. Prescott 7-0400

Oltronix Inc, 235 Underwood Dr., Atlanta 5, Ga. BLackburn 5-2576
(See advertisement on page 101)

Olympic Instruments, Inc., Vashon, Wash. HOward 3-5641
(See advertisement on page 135)

Opad Electric Co., 43-20 Walker St., New York, N. Y. WOrth 6-0380
(See advertisement on page 111)

Optical Coating Lab., Inc., 977 Sebastopol Rd., Santa Rosa, Calif. LIberty 5-6440

Optics Mfg. Corp., Amber & Willard Sts., Philadelphia 34, Pa. GA 5-3222

Optimized Devices, Inc., 864 Franklin Ave., Thornwood, N. Y. ROgers 9-6110

Opto-Metric Tools Inc., 137 Variek St., New York 13, N. Y. ORegon 5-9076
(See advertisement on page 137)

Orbitran Co., Inc., 11487 Woodside Ave., Lakeside, Calif. HIckory 3-6832

Ortho Filter Corp., 7-11 Paterson St., Paterson 2, N. J. MU 4-5858

Oster Mfg. Co., John, Avionic Div., 1 Main St., Racine, Wis. MElrose 74445

Ozone Research & Equip. Corp., 3840 N. 40th Ave., Phoenix, Arizona, AP 8-5452

P

P.B.R. Manufacturing Co., H & Luzene Sts., Philadelphia 24, Pa. GArfield 6-0932
(See advertisement on page 135)

PCA Electronics, Inc., 16799 Schoenborn St., Sepulveda, Calif. EMpire 2-0761
(See advertisement on page 162)

P-W Industries, Inc., 11200 Roosevelt Blvd., Philadelphia 15, Pa.
(See advertisement on page 195)

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Owen C. Jones Co. P.O. Box 151, Wellesley Hills 82, Mass.

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Process Equip. Co. Inc., 2548 W. 29th Ave.

DES MOINES 12, Iowa
Conrad R. Bangh Co. (Geo. W. Swallow), 4006 Grand Ave.

HOUSTON, Texas
Gay Sales Co. Inc., 420 Sul Ross St.

KANSAS CITY 12, Missouri
Power Specialties, 1214 West 47th St.

KINGSPORT, Tenn.
Abernathy-Thomas Eng. Co., 341 W. Market St.

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Calpreco, 1417 Georgia St.

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Penn-Del Inst. Sales Co., 709 Bethlehem Pike

PITTSBURGH 16, Pa.
Biltmore Products Co. Inc., 1501 Potomac Ave.

ROCHESTER 10, N. Y.
Carl A. Pearson Co., 232 Winten Rd., N.

ST. LOUIS 17, Mo.
Fred Zopff Co., 8030 Manchester

SALT LAKE CITY, Utah
Process Equip. So. 29 E. 2nd South

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Oliver B. Lyman Co., 55 New Montgomery St.

SCHENECTADY, New York
Carl A. Pearson Co., 939 Cutler St.

SEATTLE, Wash.
Automation Products, 2800 15th Ave. West

SPOKANE 2, Wash.
Automation Products, North 120 Div. St.

TAMPA 3, Fla.
Minich-DuVon Corp., 2509 W. Hillsboro Ave.

TULSA, Okla.
The Ben McKalip Co., 4176 E. Admiral Pl.

P & H Electronics, Inc., 424 Columbia, Lafayette, Ind. SH 2-0361

PIC Design Corp., 477 Atlantic Ave., East Rockaway, N. Y. LY 9-1143

P. K. Industries, Inc., 27 Porete Ave., North Arlington, N. J.
California Representative
Luscombe Engineering Co.
1129 So. Fair Oaks Ave., Pasadena, Calif. MU-2-3386
130 N. "B" St., San Mateo., Calif. DI-2-7057

P.S.P. Engrg. Co., Div. of Induction Motors Corp., N. Y., 6058 Walker Ave., Maywood, Calif. LUdlow 3-4785

Pace Engineering Co., 13035 Saticoy St., No. Hollywood, Calif. PO 5-0453

Pacific Instrument Co., 4926 East 12th St., Oakland 1, Calif. KE 2-2035

Pacific Semiconductors, Inc., 10451 W. Jefferson Blvd., Culver City, Calif. ORegon 8-4713

Pacific Technical Co., 2407 Sawtelle Blvd., Los Angeles 25, Calif. GRanite 70455

Pacific Transducer Corp., 11836 W. Pico Blvd., Los Angeles 64, Calif. GR 81134

Pacific Universal Products Corp., 168 Vista Ave., Pasadena, Calif. MUrray 1-7646

Packard Bell Electronics Corp., Technical Products Div., 12333 W. Olympic Blvd., Los Angeles 64, Calif.

Pacsol Div. of Illinois Tool Works, 500 E. Franklin Ave., El Segundo, Calif. ORegon 84931

Palmer Thermometers Inc., 2501 Norwood Ave., Cincinnati 12, Ohio. MElrose 1-1500
(See advertisement on page 27)

Palo Laboratory Supplies, Inc., 81 Reede St., New York 7, N. Y. COrtlandt 7-0075

Palos Optical Co., P. O. Box #6, Palos Heights, Ill. GIbson 8-0455

Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif. NOrmandy 1-2141

Panduit Corp., 14461 Waverly Ave., Midlothian, Ill. HIlltop 5-3134
(See advertisement on page 190)

Panellit, Inc., 7401 N. Hamlin Ave., Skokie, Ill. ORchard 5-2500

Parabam, Inc., 13000 Yukon Ave., Hawthorne, Calif.
(See advertisement on page 79)

Paragon Electric Co., 1600 - 12th St., Two Rivers, Wis. Telephone 303

Parker Electronics Co., 375 Fairfield Ave., Stamford, Conn. DAvis 3-0954

Parker-Hannifin Corp., Parker Fittings & Hose Div., 17325 Euclid Ave., Cleveland 12, Ohio. KEnmore 1-3000

Par-Metal Products Corp., 32-62 49th St., Long Island City 3, N. Y. AStoria 8-8905

Parr Mfg. Corp., 44 Austin St., Newark 2, N. J. BI 3-2340

Parr Instrument Co., 211 53rd St. Moline, Ill. Telephone 2-7716

Parsons Co., Ralph M., Electronics Div., 151 S. De Lacey Ave., Pasadena, Calif. RYan 1-0461

Partlow Corp., 217 Campion Road, New Hartford, N. Y. Utica SW-7-2222

Pass & Seymour, Inc., 50 Boyd Ave., Syracuse 9, N. Y. HOward 8-6211

Paul, F. H. & Stein Bros., Inc., 235 Fifth Ave., New York 16, N. Y. MUrray Hill 4-6370

Pearson Electronics, Inc., 707 Urban Lane, Palo Alto, Calif. DAvenport 5-3147

Pee-Wee Molding Corp., 1720 Atlantic Ave., Brooklyn 13, N. Y. PR 4-3441

Penberthy Mfg. Co., Div., Buffalo-Eclipse Corp., 1242 Hadden Ave., Detroit 2, Mich.

Penn Instruments Div., Burgess-Manning Co., 4110 Haverford Ave., Philadelphia 4, Pa.
Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Penn Optical & Instrument Co., 19642 Bristol St., Costa Mesa, Calif. KImberly 5-1165
(See advertisement on page 138)

Penn-East Engrg. Corp., Industrial Ave. Kutztown, Pa. OVerbrook 3-7307

Pennsylvania Fluorocarbon Co., Inc., 1115 No. 38th St., Philadelphia 4, Penna. EVergreen 6-0603

Pennsylvania Pump & Compressor Co., Easton, Pa.

Permag Corp., 8-06 Van Wyck Expressway, Jamaica 18, N. Y.
(See advertisement on page 168)

Performance Measurements Co., 15301 W. McNichols Rd., Detroit 35, Mich. VErmont 8-7879

Perkin-Elmer Corp., P. O. Box 730, Norwalk, Conn.

Perkin-Elmer Corp., Vernistat Div., Main Ave., Norwalk, Conn.
Dallas Representative
Allied Components Inc.
2517 Converse St., Dallas 7, Texas
RIverside 2-2830

Perkin Engrg. Corp., 345 Kansa St., El Segundo, Calif. ORegon 8-7215

Permanent Magnet Co., 4437 Bragdon St., Indianapolis 26, Ind. LIberty 7-1336

Peschel Electronics, Towners, Patterson RD. 1, N. Y. TRinity 8-3251
(See advertisement on page 105)

Peterson Co., Inc., Stuart D., 65 Culver Parkway, Rochester 9, N. Y. BU 8-2947

Petrometer Corp., 43-22 10th St., Long Island City 1, N. Y. STilwell 4-8042

Pfaltz & Bauer, Inc., 350 5th Ave., New York 1, N. Y. CHickering 4-6485

Phalo Plastics Corp., 530 Boston Turnpike, Shrewsbury, Mass. VIking 4-4021

Philadelphia Scientific Glass Co., Paletown Rd., Quakertown, Penna.
(See advertisement on page 213)

Philamon Laboratories, Inc., 90 Hopper St., Westbury, L. I., N. Y. EDgewood 3-1700

Philbrick Researches, Inc., George A., 285 Columbus Ave., Boston 16, Mass. COmmonwealth 6-5375
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Philco Corp., Govt. & Indus. Div., 4700 Wissahickon Ave., Philadelphia 44, Pa. VIctor 3-4000

Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill. NEvada 8-1116

Phillips-Drucker, Inc., P. O. Box 507, Astoria, Oregon FAirfax 3-3241

Phipps & Bird, Inc., 303 S. 6th St., Richmond 5, Va. MI 3-9163

Phoenix Precision Instrument Co., 3803-05 N. 5th St., Philadelphia 40, Pa. BA 8-7417

Photobell Co., Inc., 43 Vesey St., New York 7, N. Y. WOrth 2-6739

Photocon Research Products, 421 N. Altadena Dr., Pasadena, Calif. SYcamore 2-4131

Photomation, Inc., 96 S. Washington Ave., Bergenfield, N. J. DUmont 4-3411

Photoplating Co., 215 N. E. 5th St., Minneapolis 13, Minn. FE 5-1229

Physics Research Laboratories, Inc., P. O. Box 555, Hempstead, N. Y. IVanhoe 3-8299
(See advertisement on pages 94, 114)

Picker X-Ray Corp., Nuclear Instrument Div., 25 S. Broadway, White Plains, N. Y. WHite Plains 8-0080

Piezo Crystal Co., 265 E. Pomfret St., Carlisle, Pa. Telephone 1495

Pimex, Inc., 18 E. 60th St., New York 22, N. Y.

Pittsburgh Lectrodryer, Div. McGraw-Edison Co., 358 32nd St., Pittsburgh 1, Pa. GRant 1-8782

Planet Instrument, Inc., 616 S. Lafayette St., Fort Wayne, Ind. Telephone E-1495

Pneu Hydro Valve Corp., 52 Horse Hill Rd., Cedar Knolls, N. J.

Pneumercator, Co., Inc., 305 E. 46th St., New York 17, N. Y. PL 5-6033

Pollak Corp., Joseph, 85 Freeport St., Boston 22, Mass. AVenue 2-9550
(See advertisement on page 179)

Polymer Corp., 2120 Fairmont Ave., Reading, Pa. FR 6-5791

Polyphase Instrument Co., E. 4th St., Bridgeport, Pa.

Poly-Scientific Corp., 158 College Ave., Blacksburg, Va. PIescott 2-8212

Poole Instruments, Inc., 150 Express St., Box 1532, Dallas 21, Texas. RIverside 7-2353

Porta-Trace, Inc., 50 Wall St., Binghamton, N. Y. RA 3-7510

Porter, Inc., Geo. K., Bethlehem Pike, Hatfield, Pa. VAndyke 2-0513

Post Electronics, Div. of Post Machinery Co., 140 Elliott Street, Beverly, Mass. WA 2-0811

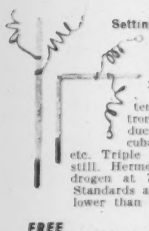
Potter & Brumfield, Inc., 1200 E. Broadway, Princeton, Ind.

Potter Instrument Co., Inc., Sunnyside Blvd., Plainview, N. Y. OVerbrook 1-3200

Power Designs, Inc., 89-25 120th St., Richmond Hill 18, N. Y.
(See advertisement on page 88)
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Powers Regulator Co., 3400 Oakton St., Skokie 10, Ill. ORchard 3-6700

Fixed Set Thermostats



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CIRCLE 394 ON READER-SERVICE CARD

Pratt & Whitney Co., Charter Oak Blvd., West Hartford 1, Conn. ADams 3-7561

Precise Measurements Company, Millbrook St., R. D. 1, Flemington, N. J.—FLemington 900
(See advertisement on page 90)

Precision, Inc., 4748 France Ave., No., Minneapolis, Minn. JU 8-9441

Precision Glass Products Co., 6137 Beechwood St., Philadelphia 38, Pa. GErmantown 8-8005

Precision Line Inc., 63 Main St., Maynard, Mass. TWin Oaks 7-3451

Precision Mechanisms Corp., 577 Newbridge Ave., East Meadow, L. I., N. Y. IVanhoe 3-8955

Precision Paper Tube Co., 2035 W. Charleston St., Chicago 47, Ill. AR 6-5200

Precision Products, Inc., Dept. BG-2, 530 S. Quaker Tulsa 5, Okla. Diamond 3-3116
(See advertisement on page 158)

Precision Products Co., Inc., of Waltham, 26 Bedford St., Waltham 54, Mass. TW 4-1400
(See advertisement on page 193)

Precision Recording Chart Co., 2430 E. Linden Ave., Linden, N. Y. HUnter 6-2102

Precision Resistor Co., 109 U. S. Hwy. #22, Hillside N. J. Bigelow 3-3809

Precision Thermometer & Instr. Co., 1434 Brandywine St., Philadelphia 30, Pa.
Pittsburgh & Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Precision Tube Co., Inc., Church Road & Wissahickon Ave., North Wales, Pa. OXbow 9-4806

Preis Engraving Machine Co., H. P. 651 U. S. Highway 22, Hillside 5, N. J. MU-6-7736

Premier Metal Products, Inc., 337 Manida St., Bronx 59, N. Y. WY-1-6600
(See advertisement on page 188)

Presin Co., 2014 Broadway, Santa Monica, Calif. EXbrook 3-9738

Pritchard, J. F. & Co. of Calif., 4625 Roanoke Pkwy., Kansas City 12, Mo. JE 1-9500

Process & Instruments, 15 Stone Ave., Brooklyn 33, N. Y. GLenmore 2-8330

Protective Closures Co., Inc., Caplugs Div., 2207 Elmwood Ave., Buffalo 23, N. Y. BEdford 9855

Pulse Engineering, Inc., 560 Robert Ave., Santa Clara, Calif. CHerry 8-8040

Pyramid Plastics, Inc., 562 W. Polk St., Chicago 7, Ill. WAbash 2-5560
(See advertisement on page 184)

Pyro-Electric, Inc., P. O. Box 152, Winnetka, Ill. Hillcrest 6-6200

Pyrometer Instrument Co., Inc., 92 Portland Ave., Bergenfield 12, N. J. DUment 4-5140
(See advertisement on page 55)

Pyro Service Co., 17121 Greeley, Detroit 3, Mich. TWinbrook 1-4023

Q

Q.V.S. Inc., 20 N. 15th St., E. Orange, N. J. ORange 3-3994

R

R-B-M Controls Div., Essex Wire Corp., 131 Godfrey St., Logansport, Ind. Telephone 5121

RKL Valve & Mfg. Co., Rt. 38 & Rudderow Ave. Maple Shade, N. J. NOrmandy 3-9150
California Representative
Carkeek Engineering Co.
285 S. Euclid Ave., Pasadena, Calif.
MUrray 1-0489

Racine & Co., Inc., Jules, 20 West 47th St., N. Y. 36, N. Y.
(See advertisement on page 67)

Radex Corp., 3676 Elston Ave., Chicago 14, Ill. ARmitage 6-6900

Radiaphone Co., Inc., 600 E. Evergreen Ave., Monrovia, Cal. ELliott 8-2585

Radiation Applications, Inc., 370 Lexington Ave., New York 17, N. Y. OR 9-9170

Radiation Counter Labs., Inc., 5121 W. Grove St., Skokie, Ill. ORchard 3-8700
Rep—N. Y., N. J., E. Pa., Dela., S. Conn.
M. J. Seavy & Sons
30 Church Street, New York, N. Y.
COrtland 7-8025

Radiation Electronics Corp., 8241 N. Kimball Ave., Skokie, Ill. ORchard 4-4900

Radiation Instrument Development Lab., Inc., 5737 So. Halsted St., Chicago 21, Ill. TRiangle 3-2345

Radio Frequency Labs., Inc., Powerville Rd., Boonton, N. J. DErfield 4-3100
California Representative
Luscombe Engineering Co.
1129 So. Fair Oakes Ave., Pasadena, Calif. MU-2-3386
130 N. "B" St., San Mateo, Calif. DI-2-7057

Rahm Instruments Div., American Machine, 65 Rushmore St., Westbury, N. Y. EDgewood 3-4840

Railway Communications, Inc., 9351 E. 59th St., Raytown 33, Mo. FLeming 3-2100

Ram Meter Inc., 1100 Hilton Rd., Ferndale 20, Mich. LIncoln 7-1000

Ramo-Wooldridge, Div. of Thompson Ramo Wooldridge Inc., 5500 W. El Segundo Blvd., Los Angeles 45, Calif. ORegon 8-0511

Ramsey Engineering Co., 1853 W. County Road C, St. Paul 13, Minn. MElrose 3-5150

Ranarex Div., Pfaudler Permutit Inc., 50 W. 44th St., New York 36, N. Y.

Ransom Research, 323 W. 7th St., San Pedro, Calif. TErminal 2-6848

Rantec Corp., 23999 Ventura Blvd., Calabasas, Calif. DIamond 75446

Rapid Electric Co., 2881 Middletown Rd., Bronx 61, N. Y. TA-8-2200

Rapid Specialties Co., 325 W. Huron St., Chicago 10, Ill. DElaware 7-1440
(See advertisement on page 158)

Rattray & Co., Geo., 116-08 Myrtle Ave., Richmond Hill 18, New York. VIrginia 6-8250

Raydyne Corp., 2715 So. 4th St., Springfield, Ill. Telephone 2-9122

Raytheon Mfg. Co., Industrial Apparatus Div., Dept. 6120, Waltham 54, Mass.
(See advertisement on page 165)

Rawson Electrical Instrument Co., 112 Potter St., Cambridge, Mass.
(See advertisement on page 106)

Red Jacket Co., Inc., 500 Bell Ave., Carnegie, Pa. WA 1-1202
Pittsburgh Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa.
WAlnut 1-6140

Red Point Corp., 1907 Riverside Drive, Glendale 1, Calif. TH 2-4895

Redford Corp., Instrument Div., Lake Luzerne, N. Y. Telephone 3064

Reeve Electronics, Inc., 609 W. Lake St., Chicago 6, Ill. RAndolph 6-9755

Reeves-Hoffman Div., Dynamics Corp. of Am., 145 Cherry St., Carlisle, Pa. Telephone 2480

Reeves Instrument Corp., Roosevelt Field, Garden City, N. Y. PIoneer 6-8100

Reeves Pulley Co., Div. of Reliance Electric & Engrg. Co., 1225 7th St., Columbus, Ind. DR 6-3311

Reeves Soundcraft Corp., 15 Great Pasture Rd., Danbury, Conn. PIoneer 3-7601

Reflectone Corp., Post Road, Stamford, Conn. DAvis 5-2351

Regent Controls, Inc., Harvard Ave., Stamford, Conn. Fireside 8-7734

Reisner Mfg. Co., W. H., Inc., 240 N. Prospect St., Hagerstown, Md. RE 3-2650

Relay Sales Inc., Dept. AC-25, P. O. Box 186, West Chicago, Ill. W. Chicago 1100

Relay Service Co., 1310 No. Pulaski Rd., Chicago 51, Ill. ALbany 2-3700

Reliance Instrument Mfg. Co. (RIMCOR), 190 Glen Cove Ave., Glen Cove, N. Y. ORiole 6-1040

Renbrandt, Inc., 6 Parmelee St., Boston 18, Mass. HI-5-3910

Renick Co., L. C., 30 S. Salsipuedes St., Santa Barbara, Calif. WO-2-0947
(See advertisement on page 177)

Reon Resistor Corp., 117 Stanley Ave., Yonkers, N. Y. YOnkers 5-9850

Republic Lens Co., Inc., 31 E. 169th St., New York 52, N. Y. CYpress 3-2790

Republic Mfg. Co., 15655 Brookpark Rd., Cleveland 35, Ohio. CLearwater 2-1800

Rese Engineering, Inc., 731 Arch St., Philadelphia 6, Pa. WAlnut 2-5841

Research Inc., 115 No. Buchanan Ave., Hopkins, Minn. WE 5-2156
(See advertisement on page 53)

Research Appliance Co., Rt. 8 at Craighead Rd., Box 807 Allison Park, Pa. STerling 2-2282
(See advertisement on page 67)

Research Controls, Box 5035, Tulsa, Okla. TEmple 8-9434
Rep—W. Pa., W. Va., Md. Panhandle, Ohio Border
Sentinel Products Co. (Wayne B. Farley)
36 Beltzhoover Ave., Pittsburgh 10, Pa.
HEmlock 1-0774

Research Products Co., 1415 - 3rd St., So., St. Petersburg, Fla. Telephone 7-8462

Research Specialties Co., 200 S. Garrard Blvd., Richmond, Calif. BEacon 5-9110

Resistors, Inc., 5226 W. 26th St., Chicago 50, Ill. OL 2-7555

Revere Corp. of America (Subsidiary of Neptune Meter Co.), North Colony Road, Wallingford, Conn.
(See advertisement on page 136)

Rex Rheostat Co., 149 Babylon Turnpike, Roosevelt, L. I., N. Y. FReeport 9-1030
(See advertisement on page 191)

Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford 6, Conn. JAckson 2-4265

Richards Co., Arklay S., Inc., 52 Winchester St., Newton Highlands 61, Mass. LAsell 7-4385

Richardson Co., 27th Ave. and Lake St., Melrose Park, Ill.

Richardson Camera Co., Inc., 2526 N. Ontario St., Burbank, Calif. VIctoria 94637

Richardson Scale Co., Clifton, N. J.

Riehle Testing Machines Div., American Machine & Metals, Inc., East Moline, Ill. Telephone 3-4561

Riggs Nucleonics Corp., 717 N. Victory Blvd., Burbank, Calif. VIctoria 9-2481

Rinco, Inc., 7962 S. E. Powell, Portland 6, Oregon PR 4-3259

Riverbank Laboratories, Dept. of Engrg., 1512 So. Batavia Ave., P. O. Box 65, Geneva, Ill. Telephone 2207

Rixon Electronics, Inc., 2414 Reedie Dr., Silver Spring, Md. LO 5-4578

Robinson Technical Products, Inc., (formerly Robinson Aviation, Inc.), Teterboro Air Terminal, Teterboro, N. J. ATlas 8-2500

Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, Ohio. FAirfax 3-6461

Robbins Aviation Inc., 2350 E. 38th St., Los Angeles 58, Calif. LUdlow 9-5221

Robins Industries Corp., 36-27 Prince St., Flushing 54, N. Y. HI 5-7200

Robinson Orifice Fitting Co., 2830 Lugo St., Los Angeles 23, Calif. ANgelus 9-1161

Rochester Div., Consolidated Electrodynamics Corp. (See Consolidated Vacuum)

Rockbestos Products Corp., Nicoll & Canner Sts., New Haven 4, Conn.

Rockland Insulated Wire & Cable Co., Inc., 36 Main St., Haverstraw, N. Y. HAverstraw 9-3103

Rockwell Engineering Co., 2141 E. 45th St., Indianapolis 5, Ind. CLifford 1-9453

Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. CHurchill 1-8400

Rockwell Co., W. S., 2128 Eliot St., Fairfield, Conn.
Pittsburgh Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa.
WAlnut 1-6140

Rodale Mfg. Co., Inc., 6th Minor St., Emmaus, Pa. WOodring 59071

Rogan Brothers, 8031 N. Monticello, Skokie, Ill. ORchard 5-1233
(See advertisement on page 166)

Rohde & Schwarz, 111 Lexington Ave., Box 275, Passaic, N. J.
New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Rome Cable Corp., 421 Ridge St., Rome, N. Y. ROme 3000

Ronningen Quick Coupling Filters, 6700 Ronningen Rd., Vicksburg, Mich.
Pittsburgh Area Representative
Forbes-Western, Inc.
940 Western Ave., Pittsburgh 33, Pa.
ALlegheny 1-9400

Rotary Devices Corp., 40 Jay St., Englewood, N. J. LOwell 9-0433

Rotating Components Inc., 267 Green St., Brooklyn 22, N. Y. EVergreen 9-3490

Rowe Engravers, Inc., 262 E. 16th St., Paterson 4, N. J. MUlberry 4-1426

Royal McBee Corp., Data Processing Div., Westchester Ave., Port Chester, N. Y. WEstmore 7-3000

Royco Instruments Inc., 874 Fabian Way, Palo Alto, Calif. DAvenport 5-2277

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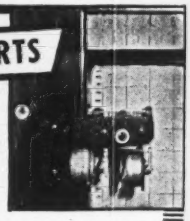

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CIRCLE 395 ON READER-SERVICE CARD

Royson Engineering Co., 103 N. Penn St., Hatboro, Pa. OS 5-2800
(See advertisement on page 215)

Rueckert Mfg. Co., 83 King St., East Greenwich, R. I. TUrner 4-2200

Ruge Associates, Arthur C., Inc., Hudson, N. H. TUxedo 2-5195
(See advertisement on page 65)

Rep—E. Pa., S. N. J., Dela., Md., D. C., Va.
Polymetric Devices Co., Inc.
P. O. Box 236, Glenside, Pa. TU-7-4873
P. O. Box 246, Silver Spring, Md.

Ruska Instrument Corp., 6121 Hillcroft, Houston 36, Texas. GYpsy 4-2533
Rep—N. Y., N. J., E. Pa., Dela., S. Conn.
M. J. Seavy & Sons
30 Church St., New York, N. Y.
COrtland 7-8025

Rust Industrial Co., Inc., 130 Silver St., Manchester, N. H. NAtional 3-3596

Rutherford Electronics Co., 8944 Lindblade St., Culver City, Calif. VErmont 9-0116

Ryan Recording Thermometer Co., 851 Poplar Pl., Seattle 44, Wash. EAst 2-8600

S

Sage Electronics Corp., Country Club Road, East Rochester, N. Y. LU 6-8010

Sanborn Co., 175 Wyman St., Waltham 54, Mass. TWinbrook 4-6300
(See advertisement on pages 84, 85)

Sanders Laboratories, 83 Uhland St., E. Rutherford, N. J. WEbster 9-2600

Sandy Manufacturing Co., 26 Maple Ave., Sellersville, Pa. ALpine 7-2989

San Fernando Electric Mfg. Co., 1509 First St., San Fernando, Calif. EMpire 1-8681

Sangamo Electric Co., Springfield, Ill. Telephone 4-6411

Saxonburg Ceramics, Inc., Saxonburg, Penna.

Scala Radio Co., 2814 19th St., San Francisco 10, Calif. VAlencia 6-2898

Scam Instrument Corp., 1811 W. Irving Park Road, Chicago 13, Ill. GR 7-7850
Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Scanivale Sales Co., Box 9814, Arlington 9, Va. JAckson 5-4541

Schaevitz Engineering, U. S. Route 130 & Schaevitz Blvd., Pennsauken, N. J. NOrmandy 2-8000

Schauer Manufacturing Corp., 4500 Alpine Ave., Cincinnati 42, Ohio. SYcamore 1-3030

Scherr Co., George, Inc., 200 Lafayette St., New York 12, N. Y. CAnal 6-3512

Schueler & Company, 75 Cliff St., New York 38, N. Y. BE 3-2813

Schutte and Koerting Co., State Road, Cornwells Heights, Bucks County, Pa. MEroury 9-0900

Scientific Glass Apparatus Co., Inc., 100 Lakewood Terrace, Bloomfield, N. J. PIlgrim 3-2200

Scientific Industries, Inc., 15 Park Street, Springfield 3, Mass. REpublic 2-6233

Scientific Instrument Co., 1041 Second Ave., Detroit 26, Mich. WOodward 2-9060

Scientific Products Co., 4200 Deepwater Terminal Road, Richmond 24, Va. BElmont 38356

Schneider Mfg. Company, 2 Linden St., Reading, Mass. RE 2-0440

Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill. POrtsmouth 7-3600

Scopes Company, Inc., P. O. Box 56, Monsey, N. Y. ELmwood 6-6339

Scott, Inc., H. H., Instrument Div., 111 Powder Mill Road, Maynard, Mass. TW 7-8801

Scott Testers, Inc., 101 Blackstone St., Providence 1, R. I. DExter 1-2853

Scrayco Mfg. Co., 201 Greene Ave., Middlesex, N. J. EL 6-2955

Seco Manufacturing Co., 5015 Penn Ave., S., Minneapolis 19, Minn. WAlnut 6-4545

Seegers Manufacturing, 515 Main St., Barrington, Ill. DU 1-2314
(See advertisement on page 48)

Seely Instrument Co., Inc., 377 Fourth St., Niagara Falls, N. Y. BUtler 2-1276

Selco Instrument Div., Eclipse Fuel Engrg. Co., Rockford, Ill. WOodland 8-3751

Selas Corp. of America, Dresher, Pa. MItchell 6-6600

Sel-Rex Corp., 75 River Road, Nutley 10, N. J. NU 2-5200

Semi-Elements, Inc., Saxonburg Blvd., Saxonburg, Pa. FLanders 2-2348
(See advertisement on page 160)

Semon Bache & Co. (see Bache)

Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N. Y. BEverly 5-2300
(See advertisement on pages 97, 98, 99, 100)

Sequoia Wire & Cable Co., 2201 Bay Road, Redwood City, Calif. EMerson 9-0331

Service Recorder Co., 1013½ Rockwell Ave., Cleveland 14, Ohio.

Representative
John T. Fuhrman, Jr.
6822 Thomas Blvd., Pittsburgh 8, Pa.
MOntrose 1-3838

Servo Systems Co., 14 Carmer Ave., Belleville 9, N. J. PLymouth 9-2875

Servo-Dynamics Corp., Main St., Somersworth, N. H. SOmersworth 1126

Servometer Corporation, 222 Main Ave., Passaic, New Jersey
(See advertisement on page 155)

Servonic Instruments, Inc., 640 Terminal Way, Costa Mesa, Calif. MIdway 6-2427
(See advertisement on page 50)

Servonics, Inc., 822 N. Henry St., Alexandria, Va. TE 6-6800

Seton Name Plate Co., 431 West Rock Ave., New Haven 15, Conn. FUlton 9-9581

Shallcross Mfg. Co., Preston St., Selma, N. C. WOodlawn 5-2341

Shaw Instrument Corp., P. O. Box A-46 Latrobe, Penna.
(See advertisement on page 56)

Sheffield Corp., Box 893, Dayton 1, Ohio. CLearwater 4-5377

Shockley Transistor Corp., Sub. of Beckman Instruments, Inc., 1117 California Ave., Palo Alto, Calif. DAvenport 1-2121

Shore Instrument & Mfg. Co., Inc., 9035 Van Wyck Expressway, Jamaica 35, N. Y. Jamaica 6-4090
(See advertisement on page 136)

Sierra Electronic Corp., 3885 Bohannon Drive, Menlo Park, Calif. DAvenport 6-2060

Sierra Engineering Co., 123 E. Montecito Ave., Sierra Madre, Calif. RYan 1-9391

Sigma Instruments, Inc., 170 Pearl St., So. Braintree 85, Mass. VIctor 3-5000

Sigmamotor Inc., 3 N. Main St., Middleport, N. Y. RE 5-3611

Silicon Transistor Corp., 150 Glen Cove Road, Carle Place, Long Island, N. Y. PIoneer 2-4100

Simmonds Aerocessories, Inc., 105 White Plains Rd., Tarrytown, N. Y. MEdford 1-7500

Simplex Valve & Meter Co., 7 East Orange St., Lancaster, Pa. EXpress 4-3792

Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill.

Simpson Optical Mfg. Co., 3200 W. Carroll Ave., Chicago 24, Ill. Van Buren 6-3030
(See advertisement on page 170)

SALES OFFICES

CALIFORNIA
Simpson Optical Manufacturing Company
1127 Wilshire Boulevard
Los Angeles 17, California
HUntley 2-4672

MASSACHUSETTS
Simpson Optical Manufacturing Company
Concord Road
South Lincoln, Massachusetts
CLearwater 9-9532

TEXAS
Simpson Optical Manufacturing Company
c/o Southern Industrial Electronics, Inc.
429 Exchange Bank, Dallas, Texas
FLeetwood 2-8995

Size Control Co., Div. of American Gage & Machine Co., 2500 W. Washington Blvd., Chicago 12, Ill. MOnroe 6-6710

Skinner Electric Valve Div., 95 Edgewood Ave., New Britain, Conn. BAldwin 5-6421
(See advertisement on page 16)

Slaughter Co., Inc., 521 Young St., Piqua, Ohio. PR 3-5936

Slip Ring Company of America, 5456 W. Washington Blvd., Los Angeles 16, Calif. WEbster 1-8156

Slocomb Co., J. T., 68 Matson Hill Rd., So. Glastonbury, Conn. MEdford 3-9485

Smith, Inc., Arthur F., 311 Alexander St., Rochester 4, N. Y. BAker 5-4670

Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis. UP 3-3000

Smith Mfg. Co., Inc., E. C., Forrest & Hector Sts., Conshohocken, Pa. TAylor 8-4790

Smith Welding Equipment Corp., 2633 4th St., S.E., Minneapolis 14, Minn. FEderal 1-1311

Snap-Tite, Inc., 201 Titusville Rd., Union City, Pa.

Sola Electric Co., 4633 West 16th St., Chicago 50, Ill. BI 2-1414

Solid State Electronics Co., 8158 Orion, Van Nuys, Calif. STate 2-6059

Sonoflux Div., Peterson Machine Tool, Inc., 6200 Merriam Drive, Merriam, Kansas. HEdrick 2-7500

Sorensen & Co., Inc., Richards Ave., South Norwalk, Conn. TE-8-6571

Sorvall, Inc., Ivan, Pearl St., Norwalk, Conn. VI 7-2491

Southwestern Industrial Electronics, 10201 Westheimer Road, Houston 19, Texas. HO 5-3471

Space Products, 2235 E. Artesia Blvd., Long Beach 5, Calif. MEtcalf 06622

Spaulding Fibre Co., Inc., 310 Wheeler St., Tonawanda, N. Y. JAckson 2000

Special Instruments Laboratory Inc., 312 W. Vine Ave., Knoxville, Tenn. Telephone 50216

Special Screw Products Co., 100 Northfield Rd., Bedford, Ohio. BEdford 2-6565
(See advertisement on page 166)

Specialties, Inc., Skunks Misery Rd., Syosset, L. I., N. Y. WAlnut 1-2345

Spectra Electronics Corp., 250 E. Third St., Mount Vernon, N. Y. MOunt Vernon 8-1378

Spectrol Electronics Corp., 1704 So. Del Mar Ave., San Gabriel, Calif. ATlantic 7-9761

Spectrum Instruments, Inc., Box 61, Steinway Station, Long Island City 3, N. Y. AStoria 8-8033

Spellman High Voltage Co., 3029 Webster Ave., Bronx 67, N. Y. Kingsbridge 7-0306
(See advertisement on page 110)

Spencer-Kennedy Laboratories, Inc., 1320 Soldiers Field Rd., Boston 35, Mass.

Sperry Products, Inc., Shelter Rock Road, Danbury, Conn. Pioneer 8-3581

Sprague Engineering Corp., 19300 So. Vermount Ave., Gardena, Calif.
(See advertisement on page 52)

Sprengnether Inst. Co., 4567 Swan Ave., St. Louis 10, Missouri
(See advertisement on page 131)

Spring Specialty Co., 23 North 5th Ave., Maywood, Ill. Fillmore 4-4602
(See advertisement on page 215)

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CIRCLE 396 ON READER-SERVICE CARD

Stackpole Carbon Co., St. Marys, Pa. TErminal 41-521

Standard Cabinet Company, 53 Washington Ave., Carlstadt, N. Y.
(See advertisement on page 34)

Standard Controls, Inc., 1130 Poplar Place, Seattle 44, Wash. EAst 4-8888 and 3-8545

Standard Gage Co., Inc., Poughkeepsie, N. Y. GR 1-3100

Standard Electric Time Co., 89 Logan St., Springfield 2, Mass. REpublic 6-7237

Standard Electrical Products Co., 2240 East 3rd St., Dayton 3, Ohio. CLearwater 3-1191

Standard Electronics Co., 1611 W. 63rd St., Chicago 36, Ill. PR 8-4222
(See advertisement on page 160)

Standard Instrument Corp., 657 Broadway, New York 12, N. Y. ORegon 3-3200

Standard Pressed Steel Co., Jenkintown, Pa. TUrner 4-7300

Standard Screw Co., 2520 Washington Blvd., Bellwood, Ill. ES 8-7400

Stanpat Co., 150-42 12th Rd., Whitestone 57, N. Y. FLushing 9-1693
(See advertisement on page 195)

Staplex Co., Air Sampler Div., 777 Fifth Ave., Brooklyn 32, N. Y. SOuth 8-2335

Starrett Co., L. S., 1-165 Crescent St., Athol, Mass. CHurchill 9-3551

States Company, 19 New Park Ave., Hartford 6, Conn.
(See advertisement on page 108)

Statham Instruments, Inc., 12401 W. Olympic Blvd., Los Angeles 64, Calif. BRadshaw 20371

Stavid Engineering, Inc., U. S. Highway 22, Plainfield, N. J. PL 7-1600

Stelma, Inc., 200 Henry St., Stamford, Conn. DAvis 4-7561

Sterling Precision Corp., Instrument Div., 17 Matlinecock Ave., Port Washington, N. Y. PO 7-7200

Sterling Transformer Corp., 297 No. 7th St., Brooklyn 11, N. Y. STagg 2-4200

Stevens Mfg. Co., Inc., P. O. Box 1007, Mansfield, Ohio. TUxedo 4-1311

Stevens Mfg. Co., George, Inc., 6022 N. Rogers Ave., Chicago 46, Ill. JU 8-1300

Stevens-Arnold Inc., 7 Elkins St., So. Boston 27, Mass. ANdrew 8-1170
(See advertisement on page 176)

Stewart, M. C., Ashburnham, Mass. TAlbot 7-5840

Stewart Corp., F. W., 4311-13 No. Ravenswood Ave., Chicago 13, Ill. GRaceland 2-6600
(See advertisement on page 192)

Sticht Co., Herman, Inc., 27 Park Place, New York 7, N. Y. REctor 2-8163
(See advertisement on pages 61, 103, 104)

Stocker & Yale, Inc., 40 Green St., Marblehead, Mass. NEptune 1-0038

Strasbaugh, R. Howard, 10990 Santa Fe Ave., Lynwood, Calif. NEvada 6-1128

Stratos Div. of Fairchild Engine & Airplane Corp., Orinoco Dr., Bay Shore, N. Y.

Pittsburgh and Buffalo Representative
M. S. Jacobs & Associates, Inc.
810 Noblestown Rd., Pittsburgh 5, Pa. WA-1-6140
1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Strecter Amet Co., Slusser & Wicks, Grayslake, Ill. BAldwin 3-4801

Stretch Wire Corp., P. O. Box 893, New Rochelle, N. Y. NE 6-6900

Stromberg-Carlson Co., Div. of General Dynamics Corp., 100 Carlson Road, Rochester 3, N. Y. Hubbard 2-2200

Stromberg-Carlson-San Diego, 1895 Hancock St., San Diego 12, Calif. CYpress 8-8331

Stromberg Time Corp., 135 So. Main St., Thomaston, Conn. ATlas 3-4381

Sturrup, Inc., 50 Silver St., Middletown, Conn. DI 6-9681

Sturtevant Co., P. A., Addison, Ill. TErrace 4-2000
(See advertisement on page 196)

Stylograph Corp., 205 W. Main St., Rochester 4, N. Y.

Sunshine Scientific Instrument, 1810 Grant Ave., Philadelphia 15, Pa. ORchard 3-5600

Superior Electric Co., 83 Laurel St., Bristol, Conn. LUdlow 2-9561

Superior Flux & Mfg. Co., 1536 St. Clair Ave., Cleveland 14, Ohio.

Superior Tube Co., Box 191, Norristown, Pa. BRoadway 5-2070

Surface Checking Gage Co., 5880 Hollywood Blvd., Hollywood 28, Calif. HOllywood 32518

Swartwout Co., 18511 Euclid Ave., Cleveland 12, Ohio. IVanhoe 1-0780

Swiss American Jewel Bearings Co., 42 Cherry Lane, Floral Park, L. I., N. Y. HUnter 8-2600
(See advertisement on page 154)

Swiss Jewel Co., Lafayette Bldg., Philadelphia 6, Pa. WA 5-1990

Switchcraft, Inc., 5555 N. Elston Ave., Chicago 30, Ill. SPring 4-1515

Switzer Brothers, Inc., 4732 St. Clair Ave., Cleveland 3, Ohio. EXpress 1-7070

Sylvania Semiconductor Div., Sylvania Electric Products Inc., 100 Sylvan Rd., Woburn, Mass.

Synchro-Start Products, Inc., 8151 N. Ridgeway Ave., Skokie, Ill. OR 3-7730
(See advertisement on page 60)

Syntron Co., 621 Lexington Ave., Homer City, Pa. GRidley 9-8011

Syracuse Electronics, 1014 E. Fayette St., Syracuse 10, N. Y. GRanite 2-0042

Systematics, Inc., 10 East 40th St., New York 16, N. Y. LExington 2-8181

Systron Corp., 950 Galindo St., Concord, Calif. MU 2-3650

T

TA Mfg. Corp., 4607 Alger St., Los Angeles 39, Calif.

Taber Instrument Corp., 107 Goundry St., North Tonawanda, N. Y. LUdlow 8900

Taft-Peirce, Mfg. Co., 32 Mechanic Ave., Woonsocket, R. I. POplar 2-1000

Tagliabue Mfg. Co., 87 Sewell St., Hempstead, L. I., N. Y. IVanhoe 3-4770

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Taurus Corp., S Coryell St., Lambertville, N. J. EXport 7-1570

Taylor Dynamometer & Machine Co., 6411 River Parkway, Milwaukee 13, Wis. BL 8-9015

Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y. BEverly 5-5000

Technical Apparatus Builders, 109 E-Liberty St., New York 6, N. Y. REctor 2-6249
(See advertisement on page 111)

Technical Appliance Corp., 1 Taco St., Sherburne, N. Y. SHerburne 7-2211

Technical Associates, 140 W. Providencia Ave., Burbank, Calif. TH-8-6649
(See advertisement on page 125)

Technical Measurement Corp., 441 Washington Ave., North Haven, Conn. CEdar 9-2501

Technical Service Corp., 917-19 S. Third St., Louisville 3, Ky. JUniper 7-8476

Technique Associates, Div. of Duncan Electric Co., 1413 N. Cornell Ave., Indianapolis 2, Ind. ME-1-4904

Technitrol Engineering Co., 1952 E. Allegheny Ave., Philadelphia 34, Pa. GA-6-9105

Techron Corp., 81 Washington St., Boston 8, Mass.

Tejax Engineering Corp., 180 Weeden St., P. O. Box 348, Pawtucket, R. I. PAwtucket 5-6788

Tektronix, Inc., P. O. Box 831, Portland 7, Ore. CYpress 2-2611

Telechrome Mfg. Corp., 28 Ranick Dr., Amityville, N. Y.

Telecomputing Corp., Data Instruments Div., 12838 Saticoy St., North Hollywood, Calif. PO 5-8160

Telerad Manufacturing Corp., 1440 Broadway, New York 18, N. Y.

Teletronics Laboratory, Inc., 54 Kinkel St., Westbury, L. I., N. Y. EDgewood 3-1027

Teletype Corp., 4100 Fullerton Ave., Chicago 39, Ill. SPaulding 2-1040

Tel-Instrument Electronics Corp., 728 Garden St., Carlstadt, N. J. WE-3-1600

New England Representative
Instrument Dynamics, Inc.
11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Dallas Representative
Allied Components Inc.
2517 Converse St., Dallas 7, Texas
RIverside 2-2830

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California Instrument
Underhill 3-0350

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Glendale 1-0813

EDMONTON, ALBERTA
Chemical & Industrial Sales, Ltd.
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Aeromotive Engineering Products, Ltd.
MONTREAL (POINTE CLAIRE), QUEBEC
Melrose 1-4396

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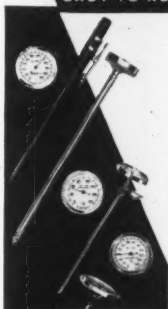

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(See advertisement on page 217)

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Tempil Corp., 132 W. 22nd St., N. Y. 11, N. Y. ORegon 5-6610

Tempo Instrument Inc., Co., Commercial St., P. O. Box 338, Hicksville, N. Y. OVerbrook 1-2280

Tenney Engineering Inc., 1090 Springfield Rd., Union, N. J. MU 6-7870
(See advertisement on page 35)

Tensitron, Inc., 124-128 Harvard Depot Rd., Harvard, Mass. GLadstone 6-3511
(See advertisement on page 217)

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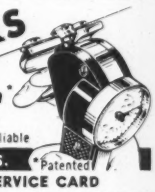

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Texas Div., Clevite Corp., 9820 So. Main St., Houston 25, Tex. MO 7-2425

Texas Instruments Inc., Industrial Instrumentation Div., 3609 Buffalo Speedway, Houston 6, Texas. JAckson 6-1411

Texas Nuclear Corp., Box 9267, Austin 17, Tex. GI 3-7288

Thayer Scale Corp., 1 Thayer Park, Hanovar, Pembroke, Mass. TAylor 6-2371

Thermal American Fused Quartz Co., 15-19 Salem St., Dover, N. J. Foxcroft 6-2807

Thermax Wire Corp., 304 E. 45th St., New York 17, N. Y. MU-8-8648

Thermco Instrument Corp., U. S. 20, LaPorte, Ind. Telephone 5158
(See advertisement on page 39)

Thermo Electric Co. Inc., 109 5th St., Saddle Brook, N. J. HUbbard 9-5800
(See advertisement on pages 45, 56, 66, 95, (See advertisement on page 217)

Thermo Electric Mfg. Co., P. O. Box 697, Dubuque, Iowa. Telephone 3-3501

Thermo-Fax Div., Minnesota Mining & Mfg. Co., 900 Bush Ave., St. Paul 6, Minn. PRospect 6-8511

Thermo Products Co. Inc., 3727 No. Palmer St., Milwaukee 12, Wis. LOcust 2-5800

Theta Instrument Corp., 48 Pine St., East Paterson, N. J. SWarthmore 7-7700

Thomas & Betts Co., Inc., 36 Butler St., Elizabeth 1, N. J. Elizabeth 4-4321

Thomas Engineering Inc., D. W., 367 W. 7th St., San Pedro, Calif. TErminal 1-1206

Thompson Clock Co., H. C., 38 Federal St., Bristol, Conn. LUdlaw 2-3186

Thompson-Ramo-Wooldridge Products Co., Div. of Thompson Ramo Wooldridge, Inc., 202 N. Canon Dr., Beverly Hills, Calif. BRadshaw 2-8892

Tiffen Optical Co., 71 Jane St., Roslyn Heights, L. I., N. Y. MAyfair 1-2700
(See advertisement on page 169)

Tigerman Engineering Co., 4332 N. Western Ave., Chicago 18, Ill. IR 8-9841
(See advertisement on page 45)

Times Facsimile Corp., 540 W. 58th St., New York 19, N. Y. JUdson 2-3030

Times Wire & Cable Co., 358 Hall Ave., Wallingford, Conn. COlony 9-3381

Tinsley Laboratories, Inc., 2526 Grove St., Berkeley 4, Calif.
(See advertisement on pages 134, 164)

Tobe Deutschmann Corp., 921 Providence Hwy., Norwood, Mass.

Torrington Company, 59 Field Street, Torrington, Conn. HUnter 2-4441

Torsion Balance Co., 35 Monhegan St., Clifton, N. J. GRegory 3-6900

Trad Electronics Corporation, 1001 First Avenue, Asbury Park, N. J.

Traid Corp., 17136 Ventura Blvd., Encino, Calif. ST 3-3373

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Transitron Electronic Corp., Wakefield, Mass.

Trans-Sonics, Inc., Wheeler Road, Burlington, Mass. BRowning 2-1000

Trenton Transformer Corp., P. O. Box 568-G, Trenton 9, N. J. OWen 5-3451

Tri-Dex, P. O. Box 1207, Lindsay, Calif. LIndsay 2-4051

Triner Scale and Manufacturing Co., 2714 W. 21st St., Chicago 8, Ill. BIshop 7-7538

Trinity Equipment Corp., Route #281, Cortland, N. Y. SKyline 6-7535

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11 Albion St., Wakefield, Mass. CRystal 6-5100
Branch: 75 Wilcox Rd., Milford, Conn.

Triplett Electrical Instrument Co., Harmon Road, Bluffton, Ohio. Telephone 323-W

Tri-R Instruments, 144-13 Jamaica Ave., Jamaica 35, N. Y. JAmaica 3-0041
(See advertisement on page 66)

Tri-Tronics Co., 2007 St. Charles Rd., Bellwood, Ill.

Tronex, Inc., G Street, Millville, N. Y. TAylor 5-1750

Trott Electronics, Inc., 412 Smith Street, Rochester 6, New York. HAmilton 6-0150

Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 11, Ky. SPring 5-6431

U

Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J. SHerwood 2-8710
(See advertisement on page 220)

Ulanet Company, George, 419 Market St., Newark, New Jersey
(See advertisement on page 68)

Ultradyne, Inc., 2624 San Mateo, N. E., Albuquerque, N. Mex. AMherst 8-2431

Ultra-Violet Products, Inc., 5114 Walnut Grove Ave., San Gabriel, Calif. CUmberland 3-3193

Ultronix, Inc., 111 East 20th Ave. San Meteo, Calif. FIreside 5-7921

Unertl Optical Co., John., 3551-55 East St., Pittsburgh 14, Pa. FA 1-2215
(See advertisement on page 135)

Ungar Electric Tools, Inc., 4101 Redwood Ave., Los Angles 66, Calif. EXmont 8-5718

Uniflow Valve Corp., 19 Quine St., Cranford, N. J. BRidge 6-8300

Uniform Tubes, Inc., Collegeville, Pa. HUxley 9-7276

Unimax Switch Div., W. L. Maxson Corp., Ives Road, Wallingford, Conn.

Union Switch & Signal Div., Westinghouse Air Brake Co., Pittsburgh 18, Pa. CHurchill 2-5000
(See advertisement on pages 81, 174)

Unit Process Assemblies, Inc., 61 East 4th St., New York 3, N. Y. SPring 7-1398

United Aircraft Products, Inc., 1116 Bolander Ave., Dayton, Ohio. BAldwin 4-3841

United Control Corp., 4540 Union Bay Place, Seattle 5, Wash. LA 5-9200

United Electric Controls Co., 85 School St., Watertown 72, Mass. WA 6-1000

United Electrodynamics, Inc., 200 Allendale Rd., Pasadena, Calif. MUtual 2-1134

United Engineers, Inc., 824 East 6th St., Tulsa 20, Okla. LUther 5-1027

United Manufacturing Co. Div., W. L. Maxson Corp., 41 Haig St., Hamden 14, Conn. CH 8-4491

U. S. Electrical Motors Inc., 200 E. Slauson Ave., Los Angeles 54, Calif. ADams 3-3131

U. S. Electronics Corp., 275 Warren St., Lyndhurst, N. J. GEneva 8-2400

U. S. Gauge Div., American Machine & Metals, Inc., Sellersville, Pa. ALpine 7-6531
(See advertisement on page 47)

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U. S. Semiconductor Products, Inc., 3540 W. Osborn Road, Phoenix, Ariz. APplegate 8-5591

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United Transformer Corp., 150 Varick St., N. Y. 13, N. Y. ALgonquin 5-3500

Unitron Instrument Div., United Scientific Co., 204-6 Milk St., Boston 9, Mass. HA-6-9878
(See advertisement on page 137)

Universal Drafting Machine Corp., 7960 Lorain Ave., Cleveland 2, Ohio. OL 1-4747

Universal Dynamics Corp., P. O. Box 9814, Arlington 9, Va. JAckson 5-4541

Universal Electronics Co., 1720-22nd St., Santa Monica, Calif. EXbrook 3-7707
(See advertisement on page 110)

Universal Mfg. Co., Inc., 1168-IC Grove St., Irvington 11, N. J. ESsex 4-9800

Universal Match Corp., Armament Div., P. O. Box 5841, St. Louis 21, Mo.

Universal Toroid Coil Winding Inc., 171-IC Colt St., Irvington 11, N. J. ESsex 4-9800

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Unitwave, Inc., 109 Marine St., Farming Dale, N. Y. CHapel 9-8180

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MUrray 8-4821 and ENterprise 9-4821

Vacuum Research Co., 420 Market St., San Francisco 11, Calif.

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Valcor Engineering Corp., 365 Carnegie Ave., Kenilworth, N. J. CHestnut 5-1065

Valor Instruments, Inc., 13214 Crenshaw Blvd., Gardena, Calif. FAculty 1-2280 and DAvis 7-6160
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Valpey Crystal Corp., 1244 Highland St., Holliston, Mass. GArden 9-4851
(See advertisement on pages 161, 189)

Vanguard Instrument Corp., 20 W. Centennial Ave., Roosevelt, L. I., N. Y. FReeport 8-8070

Van Products Co., 5755 Swanville Road, Erie, Pa. TEmple 3-5556

Van Norman Industries Inc., Electronics Div., 186 Granite St., Manchester, N. H. NAtional 5-3701

Vanton Pump & Equipment, Div. Cooper Alloy Corp., 201 Sweetland Ave., Hillside, N. J. WA 6-2435

Varflex Corp., 512 W. Court St., Rome, N. Y. Telephone 7200

Varian Associates, 611 Hansen Way, Palo Alto, Calif. DAvenport 6-4000

Vari-L Co., Inc., 432 Fairfield Ave., Stamford, Conn. FIreside 8-0091

Varo Mfg. Co. Inc., 2201 Walnut St., Garland, Texas. BRoadway 6-6141

Vector Electronic Co., 1100 Flower St., Glendale 1, Calif. CH 5-1076
(See advertisement on page 182)

Vectrol Engineering Inc., P. O. Box 1089, Stamford, Conn. DAvis 4-4602

Vee-Arc Corp., 50 Milk St., Westboro, Mass. FOrest 6-4451
(See advertisement on page 190)

Veeco Vacuum Corp., 86 Denton Ave., New Hyde Park, L. I., N. Y. PIoneer 6-1161

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(See advertisement on page 20)

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(See advertisement on page 218)

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Vickers, Inc., A&E Center, Detroit 32, Mich. LIberty 9-1122

Vickers, Inc., Electric Products Div., 1815 Locust St., St. Louis 3, Mo. CEntral 1-5830

Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif. GArfield 1-3000

Victory Engineering Corp., P. O. Box 373, Springfield Rd., Union, N. J. MUrdock 8-7150

Vinson Mfg. Co., Inc., 8044 Woodley Ave. Van Nuys, Calif. STate 6-7210

Virginia Electronics Co., Inc., River Road and B&O R. R., Washington 16, D. C.

Vitramon, Inc., P. O. Box 544, Bridgeport 1, Conn. AMherst 8-1656

Vought Co., P. O. Box 1350, Beverly Hills, Calif. CRestview 6-1131

W

Wabash Metal Products Co., Wabash, Indiana
(See advertisement on page 190)

Waber Electronics, 105 Heatherwood Rd., Havertown, Pa. Hilltop 7-1279

WacLine, Inc., 35 S. St. Clair St., Dayton 2, Ohio.

Waldom Electronics Inc., 4625 W. 53rd St., Chicago 32, Ill. LUdlow 5-1212

Walkirt Co., 141 W. Hazel St., Inglewood 3, Calif., ORegon 8-4814

Wall Colmonoy Corp., 19345 John R., Detroit 3, Mich. TWinbrook 3-3800

Wallace & Tiernan, Inc., 25 Main St., Belleville 9, N. J. PLymouth 9-8000
(See advertisement on pages 44, 48, 49, 50)

Walser Automatic Timer Corp., 420 Lexington Ave., New York 17, N. Y. LEx 2-9774

Waltham Horological Corp., 400 Lynnway, Lynn, Mass.

Wang Laboratories, Inc., 37 Hurley St., Cambridge 41, Mass. UNiversity 4-8380

Ward Leonard Electric Co., Mt. Vernon, N. Y. MO 4-1000

Warner Electric Brake & Clutch Co., Beloit, Wis. DUnkirk 9-2211

Warner & Swasey Co., Control Instr. Div., 34 W. 33rd St., New York 1, N. Y. LAckawanna 4-1536

Warren Transformer Co., Inc., 103 Warren St., Tunkhannock, Penna. TErrace 6-8411

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(See advertisement on page 43)

Warwick Products, 1572 Riverbed, Cleveland 13, Ohio. Ch 1-6260
(See advertisement on page 157)

Waterman Products Co., Inc., 2445 Emerald St., Phialadelphia 25, Pa. GArfield 6-8600
(See advertisement on page 92)

Waugh Engineering Co., 7842 Burnet Ave., Van Nuys, Calif. STate 2-1710
(See advertisement on page 37)

Waukee Engineering Co., Inc., 5136 North 35th St., Milwaukee 9, Wis. UPtown 1-5413

Waukesha Motor Co., St. Paul Ave., Waukesha, Wis. LIberty 7-7995

Waveline, Inc., P. O. Box 718 Passaic Ave., W. Caldwell, N. J.

Waxon-Carboff, Inc., 8 Commercial St., Rochester 14, N. Y. HA 6-1240
(See advertisement on page 156)

Weatherhead Co., Ft. Wayne Div., 128 W. Washington Blvd., Ft. Wayne, Ind. E-8055

Webber Engineering Corp., P.O. Box 217, Indianapolis 6, Ind. MElrose 2-1378

Weckesser Co., 5701 N. Northwest Highway, Chicago 46, Ill. ROdney 3-6688 TWX CG 3015

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1807 Elmwood Ave., Buffalo 7, N. Y. DE-3229

Weinschel Engineering, 10503 Metropolitan Ave., Kensington Md. LOckwood 4-0122

Weiss & Son, Inc., Albert A., 263 Vanderbilt Ave., Brooklyn 5, N. Y. NE 8-0777

Weksler Instruments Corp., 195 E. Merrick Rd., Freeport, L.I., N. Y. MAyfair 3-0100
(See advertisement on page 55)

Welch Electric Co., 1221 Wade St., Cincinnati 14, Ohio. MAin 1-7122

Welch Scientific Co., W. M., 1515 Sedgwick St., Chicago 10, Ill. MIchigan 2-2000

Wells Electronics Co., 1701 S. Main St., South Bend 23, Ind. AT-8-4651

West Instrument Corp., 4363 W. Montrose Ave., Chicago 41, Ill. AVenue 6-1007

Westamp, Inc., 11277 Massachusetts Ave., Los Angeles 25, Calif. GR 88894

Westberg Mfg. Co., Box 239, Napa, Calif. BAldwin 6-5218

Western Apparatus Co., Div. of Comptometer Corp., 2001 Greenleaf, Evanston Ill., UNiversity 8-9580

Western Design, Div. of U. S. Industries, Inc., Santa Barbara Airport, Goleta, Calif. WOodland 7-4571

Western Devices, Inc., 600 W. Florence Ave. Inglewood, Calif.
(See advertisement on page 171)

Western Electronic Products Co., 655 Colman St., Altadena, Calif. SYcamore 4-6379
(See advertisement on page 218)

Western Gear Corp., Electro Products Div., 132 W. Colorado St., Pasadena, Calif.

Western Insulated Wire Co., 2425 E. 30th St., Los Angeles 58, Calif. Ludlow 7-7103

Western Radiation Laboratory, 1107 W. 24th St., Los Angeles 7, Calif. RIchmond 7-8355

Westinghouse Electric Corp., P.O. Box 868, Pittsburgh 30, Pa.

Westinghouse Electric Corp., Director Systems Dept., 350 Collins Ave., Pittsburgh 6, Pa. EM 2-2500

Westinghouse Electric Corp., Semiconductor Dept., Youngwood, Pa. WA 5-7272

Westline Products Div., 600 E. 2nd St., Los Angeles 54, Calif. MAdison 7-2641

Weston Hydraulics Ltd., Sub. of Borg-Warner Corp., 10918 Burbank Blvd., No. Hollywood, Calif. STanley 7-3201

Weston Instruments Div., Daystrom, Inc., 614 Frelinghuysen Ave. Newark 12, N. J. BIgelow 3-4700

Westronics, Inc., 3605 Mc Cart St., Ft. Worth, Texas. WA 3-8211

Wheeler Electronic Corp., Subsidiary of Sperry Rand Corp., 150 E. Aurora St., Waterbury 20, Conn. PLaza 4-5191

Wheeler Manufacturing Co., C. H., 19th & Lehigh Ave., Philadelphia 32, Pa.

Wheelock Signals, Inc., 273 Branchport Ave., Long Branch, N. J. CApital 2-6880

White Dental Mfg. Co., S. S., Industrial Div., 10 East 40th St., New York 16, N. Y. MU-3-3015

White Instrument Laboratories,. P. O. Box 9006, Allandale Station, Austin 17, Tex. GLendale 3-8447

Whitney Blake Co., 1537 Dixwell Ave., New Haven 14, Conn. Chestnut 8-5515

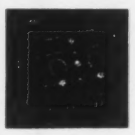
Wiancko Engineering Co., 255 Halstead Ave., Pasadena, Calif. RYan 1-4471

Will Corporation, Wilco Drive, Rochester 3, N. Y. BRowning 1-8200

Williams Apparatus Co., Inc., Herald Bldg., Watertown, N. Y. SU 2-3420

Wilmington Fibre Specialty Co., New Castle, Del. EAst 8-7525

Wilson & Co., G. C., 1915 8th Ave., Huntington W. Va. JA 3-5149
(See advertisement on page 218)



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Winslow Co. Inc., Dept. 1 P, 701 Lehigh Ave., Union, N. J. MUrdock 8-0020

Wood, N. Counter Laboratory, 1525 E. 53rd St., Chicago 15, Ill. FAirfax 4-1114

Worcester Valve Co., Inc., Worcester 10 Mass.
(See advertisement on page 71)

Worden Labs., 695 Rocky River Rd., Houston 27, Tex. MOhawk 7-0755

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1960 Instruments & Control Systems Buyers' Guide

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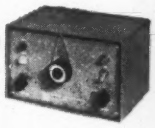
Yardney Electric Corp., 40-50 Leonard St., New York 13, N.Y. WOrth 6-3100

Yarnall-Waring, 102 E. Mermaid Lane, Philadelphia 18, Pa. CH-8-2600

Yellow Springs Instrument Co., P. O. Box 106, Yellow Springs, Ohio. ROckwell 7-7242
(See advertisement on page 219)

YSI MODEL 71 THERMISTOR BASED TEMPERATURE CONTROLLER



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Control Load - - - - - - 20 AMP

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Z

Zeiss, Inc., Carl, 485 Fifth Ave., New York 17, New York
(See advertisement on page 123)

Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill. MI-2-3322
(See advertisement on page 69)

Zenith Optical Laboratory, 1940 Great Neck Rd., Copiague, L. I., New York. Amityville 4-4616
(See advertisement on page 180)

Zernickow Co., O., 15 Park Row, New York 38, N. Y. BArclay 7-2264
(See advertisement on page 62)

Zero-Max Co., 1900 Lyndale Ave., So., Minneapolis 5, Minn. FRanklin 4-5520
(See advertisement on page 60)

Zippertubing Co., 752 S. San Pedro St., Los Angeles 14, Calif. MAdison 4-6664

Zoomar, Inc., 55 Sea Cliff Ave., Glen Cove, L. I., N. Y. ORiole 6-1900
(See advertisement on page 170)

Zophar Mills, Inc., 112-26th St., Brooklyn 32, N. Y. SOuth 8-0907

Laboratory Supply House

Aerotest Laboratories, Inc., 129-11 18th Ave., College Point 56, N. Y. INdependence 1-7272

Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill.

Fisher Scientific Co., 711 Forbes Ave., Pittsburgh 19, Pa. EXpress 1-1330

Greiner Co., Emil, 20 N. Moore St., New York 13, N. Y. WO-6-4700

New York Scientific Supply Co., Inc., 28 W. 30th St., New York 1, N. Y. LE-2-2981

Palo Laboratory Supplies, Inc., 81 Reade St., New York 7, N. Y. COrtlandt 7-0075

Will Corporation, Wilco Drive, Rochester 3, N. Y. BRowning 1-8200

Wisconsin Science Supply Co., 1419 Underwood Ave., Milwaukee 13, Wis. BLuemound 8-4450

Heil Scientific, Inc., 214 S. 4th St., St. Louis 2, Mo.

Southwestern Engineering & Equipment Co., 3906 Lemmon Ave., Dallas, Texas

Electronic Equipment Distributors

Allied Radio Corp., 100 N. Western Ave., Chicago 30, Ill. HAymarket 1-6800

Avnet Corporation, 5877 Rodeo Rd., Los Angeles 16, Calif. TE-0-6141

Electro Tech Equipment Co., 308 Canal St., New York 13, N. Y. WO-6-2350

Electronic Enterprises, 124 N. Third St., Philadelphia 6, Pa. WAlnut 5-4930
(See advertisement on page 204)

Hughes Co., Kenneth E., 4808 Bergenline Ave., Union City, N. J. UNion 7-3204
(See advertisement on page 208)

Lafayette Radio Corp., 165-08 Liberty Ave., Jamaica 33, N. Y. AX-1-7000
(See advertisement on page 95)

Lectronic Research Labs., 715 Arch St., Philadelphia 6, Pa. MArket 7-6771

Newark Electric Co., 223 W. Madison St., Chicago 6, Ill. ST-2-2944
(See advertisement on page 212)

Peerless Radio Distributors, Inc., 92-32 Merrick Rd., Jamaica 33, N. Y. JAmaica 3-3456

Relay Sales, Inc., Box 186, West Chicago, Ill. Telephone West Chicago 1100

Schweber Electronics, 60 Herricks Rd., Mineola, L.I., N. Y. PIoneer 6-6520

Tripoli Electronics Co., 1949 W. Erie St., Chicago 22, Ill. TAylor 9-8580

Universal Relay Corp., 42 White St., New York 13, N.Y. WAlker 5-9642
(See advertisement on page 175)

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IF

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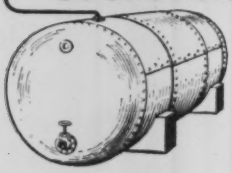
UEHLING INSTRUMENT COMPANY

473 Getty Avenue, Paterson 3, New Jersey
Recording, Indicating and Control Apparatus

UEHLING TANK-O-METER



FOR MEASURING
LIQUID LEVELS
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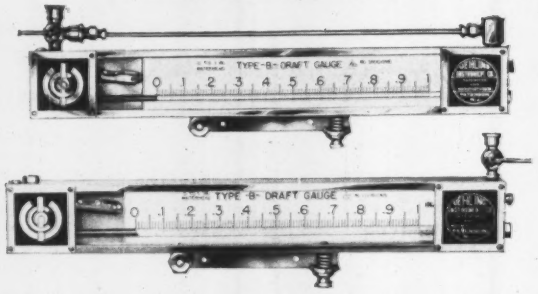
ANY DISTANCE AWAY

TANK-O-METERS may be applied to the measurement of ACIDS, ALKALIS, WATER, OIL, GASOLINE, ALCOHOL, BEVERAGES, TAR, MOLASSES, MILK, PAINTS, VARNISHES, SODIUM SILICATE, SOLVENTS, OR ANY OTHER CHEMICAL SOLUTION. *Send for Bulletin No.* 945.

INCLINED DRAFT GAUGES
For Plus or Minus Pressure
For Differential Pressure



The Uehling Draft Gauges are available with scales from 10″ to 70″ and waterheads ranging from 1″ to 14″. Scales are graduated for every 1/100″ of waterhead. Each instrument is housed in a durable aluminum case with glass front and adjustable scale. They are extremely accurate as each instrument is individually calibrated. Furnished for draft, pressure, or differential pressure. *Send for Bulletin* 1146.

U-TUBES (STRAIGHT TUBE TYPE)

Uehling U-Tube Pressure and Vacuum Gauges consist of straight Pyrex tubes with a bottom metal connecting base, housed in aluminum case with glass front.

Each instrument has an external micrometer scale adjustment, zero check cock, and drain valve.

Scale lengths from 10″ to 100″.

Four indicating fluids.

Special calibration on request.

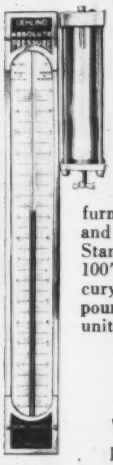
Send for Bulletin 828.

PRESSURE AND VACUUM GAUGES

Meet the most exacting requirements and combine accuracy, reliability, simplicity and durability. Housed in durable Aluminum cases with glass fronts. Standard instrument covers a range of 31 inches of mercury head. A catch-all for trapping visibly shows any condensate in the connecting line. Each scale has a knurled micrometer screw adjustment. A simple means is provided for cleaning the Pyrex manometer. May be calibrated in any desired units for pressure or vacuum and may be provided with a plus or minus scale to read either vacuum or pressure on the same instrument. Length to suit any range. Greater flexibility is made possible by choice of either mercury or one of three other indicating fluids.

Send for Bulletin 147.

MERCURY COLUMN ABSOLUTE PRESSURE INDICATORS



Uehling Mercury Column Absolute Pressure Gauges are designed for exacting requirements of modern engineering practice, and combine accuracy, reliability, simplicity, and durabillty. Used with all processes where extremely accurate absolute pressure determinations are essential. Can furnish catch-all for trapping and showing any condensate. Standard scale lengths of 7″ to 100″, graduated in 1/10″ of mercury absolute pressure or in pounds or in equivalent metric units.

Send for Bulletin 247.

TEL-FLO METER

For measuring flow rates and purging line. Are accurate, exceptionally durable, and attractive. Housed in aluminum case with plastic front to protect graduated glass tube. Can be furnished in aluminum, brass, or stainless steel bodies (or any other metal). Suitable for maximum pressures of 300 lbs. Higher pressures upon request. Furnished with or without control valve and with either top, side, or back connection.

Send for Bulletin 553.

MERCURIAL BAROMETERS

The Uehling Mercurial Barometer is furnished with a scale range of 20″ to 31″ of mercury graduated for every 1/10″, with external vernier scale adjustment which provides readings of .01 of an inch of mercury throughout the range of 20″ to 31″ of mercury, or with a scale range of 500 to 780 millimeters of mercury graduated for every 1 millimeter with external vernier scale adjustment, which provides readings of .1 millimeter of mercury.

It can be furnished for flush mounting or surface mounting with or without oak panel board.

Send for Print 1155.

COMBINED BAROMETER AND VACUUM RECORDER

Records barometric pressure and vacuum on same chart. Distance between the two recorded lines represents the absolute pressure. Permanent accuracy and remarkable legibility are the outstanding characteristics of this recorder. Accuracy is obtained by the employment of the mercury column principle and consequently this recorder has the same high degree of accuracy as the mercury column indicator. It employs no springs, diaphragms, or multiplying levers, therefore holds its calibration permanently without readjustment.

Send for Bulletin 150.

UEHLING VACUUM RECORDER

Same as above, without barometric pen.

Send for Bulletin 140.

SPECIAL TANK-O-METERS

For fuming liquids, such as hydrochloric acid, nitric acid, propane, butane, ammonia, ethyl chloride, etc.

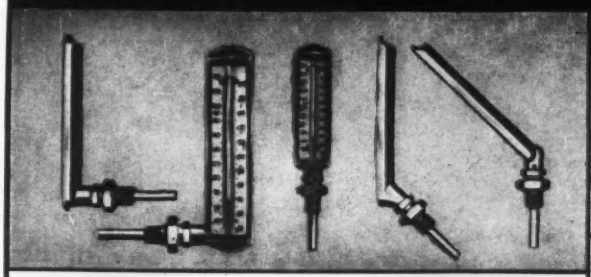
CIRCLE 403 ON READER-SERVICE CARD

MOELLER INSTRUMENT COMPANY

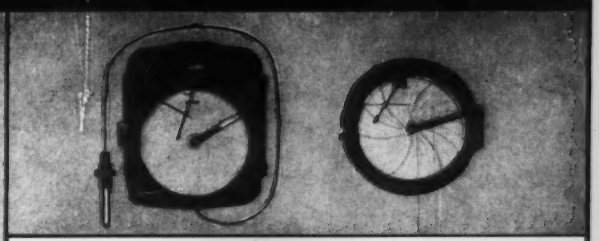
SINCE 1867

132nd STREET & 89th AVENUE, RICHMOND HILL, NEW YORK, N.Y., U.S.A.

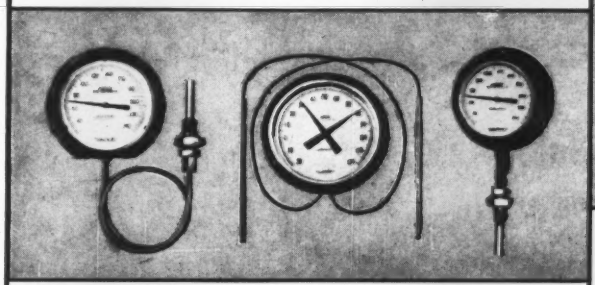
Representatives in Principal Cities



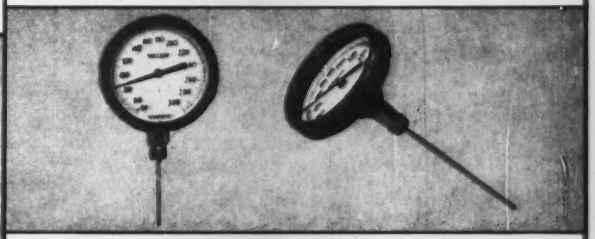
MOELLER INDUSTRIAL THERMOMETERS made in all forms, Straight, Angle, Right Side Angle, Left Side Angle, Reclined and Inclined Angles, in scale ranges from minus 120 to plus 1125°F. or its equivalent in centigrade. Available in 5″, 7″, 9″ and 12″ scale sizes with plain stems, union connection stems and separable sockets in all stem lengths and alloys.



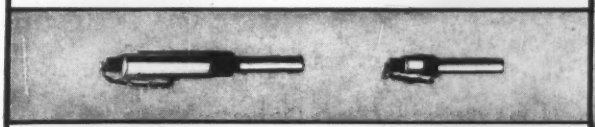
RECORDING THERMOMETERS, Mercury Actuated, made in the round or rectangular cases. Charts 10″ or 12″, 1 hour, 12 hour, 24 hour or 7 day. Ranges from minus 40 to plus 1000°F. or its equivalent in centigrade. Made in remote reading, direct reading, portable and self contained styles. Plain stems, union connection stems and separable sockets in all stem lengths and alloys.



DIAL INDICATING THERMOMETERS, Mercury Actuated, made in 4½″, 6″ and 8½″ sizes with flexible extension tubing. Adjustable rigid stems, single or two pointers, plain bulb, union connection bulb or separable sockets in all lengths and alloys. Scale ranges from minus 40 to plus 1000°F. or its equivalent in centigrade.



MOELLER BIMET THERMOMETERS are actuated by a powerful, specially processed bi-metal helix. Made in 5″ and 3″ diameter case size. Rigid stainless steel stem, can be furnished with union connection stem and separable socket in all alloys. Scale ranges from minus 100 to 1000°F or equivalent in centigrade.



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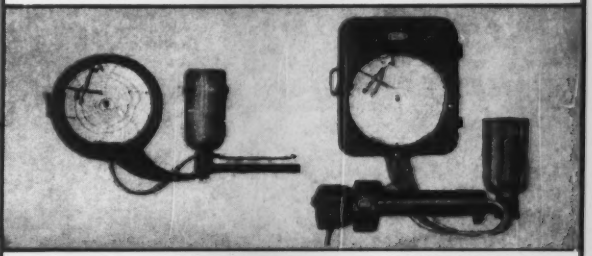
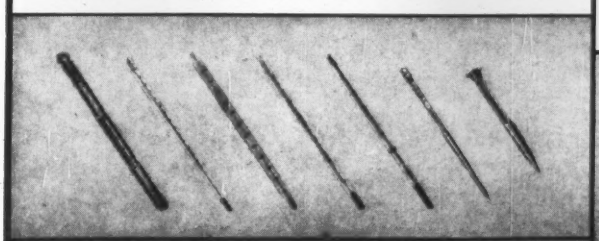
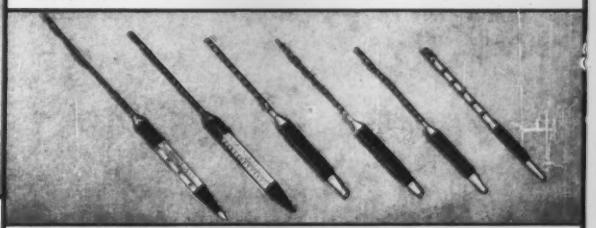


RECORDING PSYCHROMETERS, Mercury Actuated. Round and Rectangular Case, 12 hour, 24 hour or 7 day charts, self contained or remote reading, with or without motor driven fan.



ENGRAVED STEM and PORCELAIN and PAPER SCALE THERMOMETERS made in ranges from minus 150 to plus 1125°F. or its equivalent in centigrade. Available in standard and extreme precision grade. Made to meet specifications of the Government, A.S.T.M. and other authoritative bodies.

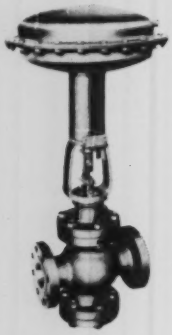


HYDROMETERS PLAIN FORM or COMBINED with THERMOMETER. Made in all scales specific Gravity or Baume for heavy and light liquids. Brix, Twaddle, Ballings Scales, etc. available for all liquids. Standard and commercial grades.

CIRCLE 404 ON READER-SERVICE CARD

...OW—4 GREAT "NAMES" UNDER ONE ROOF!

Whatever your particular requirement or special preference in industrial control valves, operators, and accessories—you'll find it under the famous General Controls "roof." Pneumatic, electric direct drive, electro-hydraulic; pressure reducing valves, regulators, safeties and flow tubes—you name it, we'll deliver it. And **every** General Controls product is backed by an international sales and service organization. Nine plants, 44 factory branch offices, plus exclusive factory sales representatives—throughout the United States, Canada and Western Europe. At **your** service. Check the Yellow Pages for your local branch office or sales representative.



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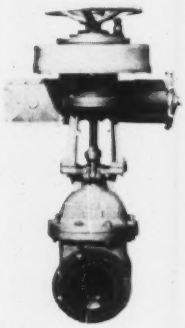
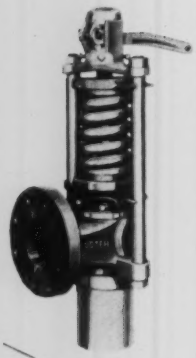
Now combined with the Foster Engineering Division in a modern 112,000 square foot plant in Warwick, Rhode Island, the Hammel-Dahl Division produces a complete line of pneumatic control valves—diaphragm or piston operated, split or integral bodies for every application.



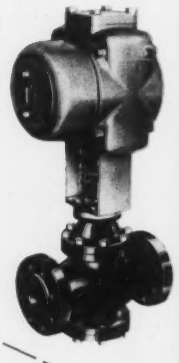
TORK-MASTER

These powerful electric gear-driven actuators are designed to convert manual valves to automatic without removing valve bodies from line. Eliminates costly down time—ideal for centralized control from remote point.



FOSTER

Long a prominent "name" in the field of heavy duty steam reducing valves, regulators, high pressure safety valves, and a pioneer of the famous Gentile® flow tube, the Foster Engineering Division adds a new dimension to the General Controls line of industrial control valves and accessories.



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